INDUSTRIAL REFRIGERATION

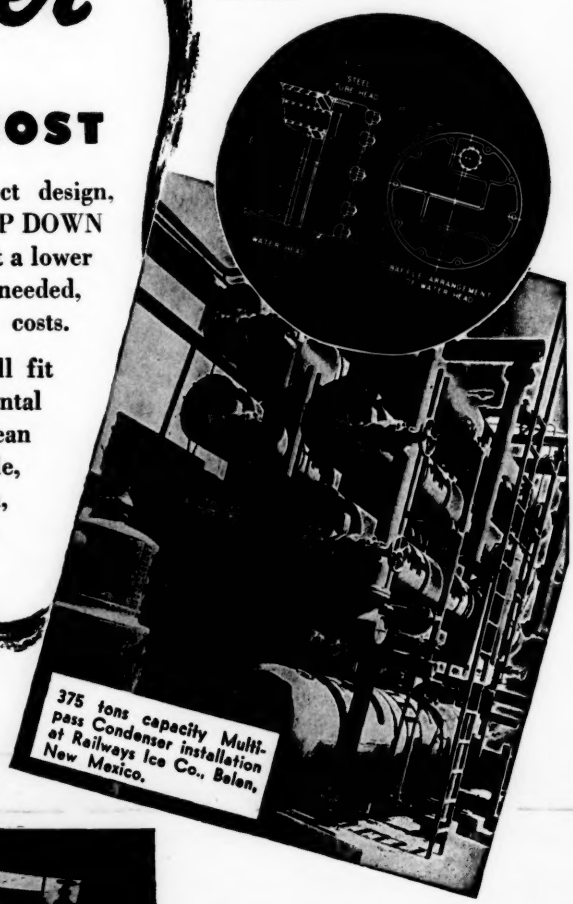
$ave Power and REFRIGERATION COST

Vogt Condensers, because of their correct design, STEP UP the rate of heat transfer and STEP DOWN head pressures. With the liquid delivered at a lower temperature, smaller compressor capacity is needed, saving in original as well as operating costs.

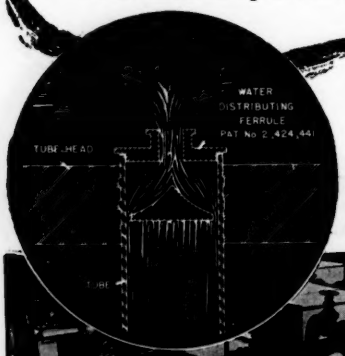
One of the two basic types illustrated will fit your operations exactly. Install Horizontal Multipass (closed type) for use with clean waters. Where the water is hard, forms scale, contains mud or promotes fungus growth, Vertical Single Pass (film type) which can be cleaned in operation, are recommended.

Horizontal Multipass Condensers
(Closed Type)

Water circulated in tubes traverses the length of the unit a number of times as determined by baffles in the heads.

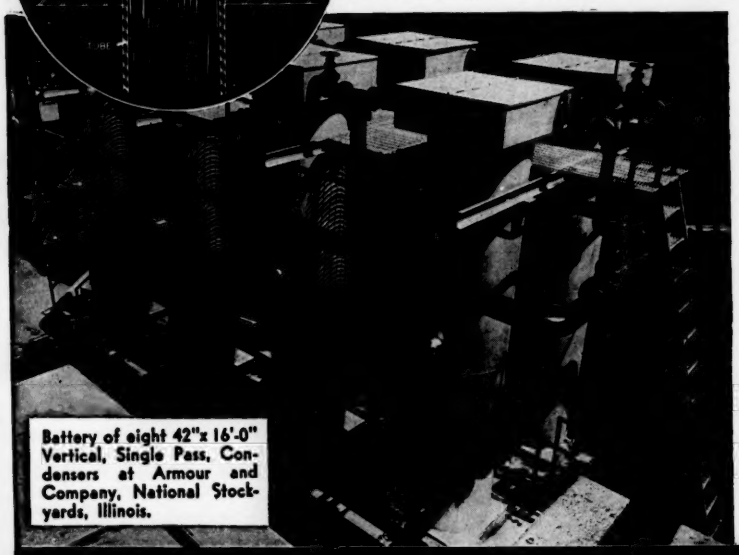


375 tons capacity Multipass Condenser installation at Railways Ice Co., Belen, New Mexico.



Vertical Single Pass Condensers
(Film Type)

Patented ferrules give equal distribution of water to and over the surfaces of all tubes in a unit.



Battery of eight 42"x 16'-0" Vertical, Single Pass, Condensers at Armour and Company, National Stockyards, Illinois.

HORIZONTAL and VERTICAL TYPES SHELL and TUBE CONDENSERS For Every Service

Write For Bulletin RC-2
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INCORPORATED
1000 W. ORMSBY ST., LOUISVILLE 10, KY., U.S.A.
Branch Offices: NEW YORK, CHICAGO, CLEVELAND, DALLAS, PHILADELPHIA, ST. LOUIS, CHARLESTON, W. VA.

Vogt REFRIGERATION CONDENSERS

VESTIBULE TYPE TRACK DOOR FOR TEMPERATURES 50 TO 20

YEARS OF SATISFACTION

"Butcher Boy"

Quality Since 1885

WHY "BUTCHER BOY" DOORS ARE THE FINEST REFRIGERATOR DOORS BUILT!

These Exclusive Features Furnished At No Extra Cost

DOOR STRUCTURE

New X Type Diagonal bracing
INTERLOK No Sag Corner Construction
Permits maximum insulation till inside of door

HARDWARE

20[illegible] to 150[illegible] incorporated in all doors
Aluminum fitting for [illegible] doors
Sanitary, all working parts enclosed

APPEARANCE

Massive 1¾ thick SOLID Douglas Fir front
Vertical specially milled alternating panels
Modern and more durable hardware applications to match doors

When a Man Thinks Twice ...He Makes Comparisons

COOLER FREEZER 50 TO 30 | X-52 PLYWOOD 50 TO 10 | LOW TEMPERATURE 10 TO 20 | SUPER FREEZER OVERLAP 0 TO 100

BUTCHER BOY REFRIGERATOR DOOR CO. HARVARD, ILLINOIS

STAND-OUT

More About Irradiation

THE refrigeration industries have read and listened to bewildering and confusing public statements about the impact of ionizing radiation on their future, says a recent issue of TRRF Information Bulletin. TRRF's report on "Radiation of Foods — A Canvass of Facts and Opinions" which was reviewed in the August INDUSTRIAL REFRIGERATION, has contributed substantially to a down-to-earth understanding of the question and has been widely and very favorably commented on.

An analysis of the facts that bear on the relationship of so-called "cold" sterilization to the canning industry is given by C. Olin Ball in Food Technology. Dr. Ball is highly competent in the field of research on canning and in food science generally. Regarding radiation sterilization he calls attention to the fact that whereas in canning more heat is required to destroy bacterial life than to inactivate enzymes, the opposite is true with ionizing radiation. In fact, so great dosage is required that changes occur in the molecular structure of the foods.

He concludes that heat will continue indefinitely to be the most effective lethal agent for use in sterilization of foods for these reasons: Its effects on eating quality are less offensive than those of ionizing rays. It is known that products that have undergone caramelization by heat are non-injurious, but the physiological effects of ray treatment are not known. Further, modern canning can avoid undersirable caramelization.

His next two reasons are related to refrigeration. He points out that the freshly cooked quality of heat-sterilized foods in suitable packages can be preserved for any reasonable period (2 to 3 years) by storage at 32 to 36 F. He said also that "in the light of present knowledge, it is purely naive to believe that food preserved by ray treatment would not require cold storage."

"Many packers", he says, "feel that it is unrealistic to store canned foods under refrigeration because of the cost. One thing they seem to forget is that it costs more than half as much to store and handle their goods in the way they do at present as it would cost if they stored them under refrigeration."

Industrial Refrigeration

formerly ICE AND REFRIGERATION
Now in its 64th Year of Publication
J. F. NICKERSON, FOUNDER

Vol. 130 February, 1956 Number 2

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The Cover:

Two vertical multi-cylinder V-belt driven compressors used in connection with the 30-ton Pakicers at dye manufacturing plant of Hilton-Davis Company, Cincinnati, Ohio. Pictured in the lower right hand corner is a 4 x 4 Vertical Single Acting compressor used in connection with the ice storage bin at this plant. See story on page 20.

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Now-
Trade In!
Trade Up!

Up to 24 months to pay on Gifford-Wood's famous Type CA cuber

GET THIS NEW 26,000-AN-HOUR CUBER WITH G-W'S GREAT NEW TRADE-IN DEAL!

Here's a top deal that can increase your ice cube volume overnight! Think of the extra business you'll handle... the reduced labor and handling costs you'll have... and the years of trouble-free service you'll get with a new Gifford-Wood Cuber in your plant.

And the best news is G-W's generous trade-in offer! Turn in your old G-W Cuber—it serves as your down payment. Then take up to 24 months to pay with G-W's new and easy Pay-Way Plan! You're earning big profits while your G-W pays for itself by turning out up to 26,000 perfect ice cubes an hour.

G-W's Type CA Cuber is specially designed to eliminate ice waste. As soon as the first cake is ¾ cut, the second cake slides easily into place, pushing the remaining quarter into the saws. And every part of the cuber that touches the ice is not only sturdy, but completely corrosion-proof. Maintenance costs are rock bottom.

Write today for a Bulletin which fully describes this advanced Type CA... and let a G-W representative tell you just how much you'll get when you trade in your old G-W Cuber. (You'll be pleasantly surprised!) And if you're just coming into the market for a large-volume cuber, why not find out how a low-cost, *completely reconditioned* G-W Cuber can build up business—*fast!* For even if you don't have a cuber to trade, you may wish to take advantage of G-W's terms!

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☐ Ask a G-W Representative to call with full information on your proposal at no obligation to me, of course.

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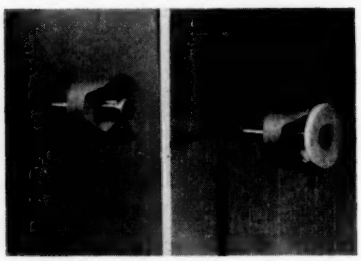
What's New

MACHINERY
APPLIANCES • PROCESSES

Introduces Self-Attaching Portable Thermo-Couple

TEMPERATURES of surfaces from minus 200 to plus 1000 F may be more easily obtained by means of the "Magne-Kuple", a portable thermo-couple with instantaneous attachments marketed by Thermo-Products Co., Milwaukee. Designed for close thermal relationship with the surface being measured, heat transfer is accomplished by the use of a permanent magnet to which the thermocouple is resiliently attached. The magnet will hold the "hot junction" of the thermo-couple in direct contact with the surface.



Standard Magne-Kuple assembly (left) showing extended, spring-loaded, temperature sensing tube — ready to engage against a magnetic surface. Used with standard millivoltmeters or potentrometers. Right—Magne-Kuple assembly with a special adhesive backed keeper (washer) for taking temperatures or non-magnetic surfaces. (Unit shown is mounted against a pane of glass.)

The magnet will attach itself to the surface and compress a spring which in turn will position the "button" (hot junction) of a slideable tube against the surface. The unique feature of this assembly is that the wires are joined at a point only .030 inches away from the contact surface. This results in a very accurate reading and extremely fast response time.

Heretofore, when measuring surface temperatures, it was necessary to prepare the surface in some manner to receive the thermocouple wires. This was usually accomplished by drilling into the surface and then peening, or by soldering or brazing. These and other methods require a great deal of effort both in preparing the surface and then later in removing the thermocouple wires. The Magne-Kupie eliminates these surface preparations.

Standard units of the Magne-Kuple are used on magnetic surface (see fig. at left). A special adapter is available for attachment to non-magnetic surfaces such as glass, wood, aluminum, certain stainless steels, etc. (see right Fig.). A metal washer is utilized, with a new type of Fiberglass-adhesive backing that will hold the unit on surfaces up to 500 F. The spring loaded tube passes thru center of washer and makes direct surface contact.

This portable instrument component is also furnished for special applications, such as harness assemblies for multiple readings, recessed hole temperatures, and concave and convex surfaces. A special placement and pick-up tool is available for reaching difficult points. It is flexible and may be obtained in lengths of 12, 24, 30 or 36 inch.

The Magne Kuple is only ¾ in. long with a ½ in. O.D. It is available with Copper-Constantan, Iron-Constantan or Chromel-Alumel wires for temperatures to minus 200 F, to plus 400 F, and 1000 F respectively. Insulation on wires — Nylon or Polyvinyl Chloride for low ranges to plus 225F, and Fiberglass for high temperatures. Standard leadwire length is 72 inch. Operating temperature and wire calibration should be specified when inquiring or ordering. This unit may be used with any standard milli-voltmeter or potentiometer type instruments.

Blower Evaporator Provides New Performance for Truck

A NEWLY-DESIGNED blower evaporator, weighing only 60 pounds, offers new pulldown performance in the new continuous truck refrigeration system introduced by the Kold-Hold Division, Tranter Manufacturing, Inc., Lansing, Mich. The new system, known as the Kold-Trux MARK B series, weighs only 410 pounds installed and provides simplicity of operation, ease of installation, and, in the new Turbo-Jet blower evaporator, the first practical method of automatic frost prevention in truck refrigeration. The evaporator unit is 19⅜ inches wide, 29½ inches long and 16⅝ inches high. By use of a shrouding and venturi arrangement, this smaller, lighter unit gives higher capacity.

The fan is placed with the blade at right angles to the coil and at one end of the coil. A shroud encloses the fan and slopes to the far end of the coil. In this way, circulation of air through the coil is evenly distributed over the entire surface of the coil, making use of its full capacity. It is placed on the cold air side of the coil. In effect, this makes it a suction fan in the evaporator assembly, drawing air through the cooling fins, and blowing the cold air toward the rear of the body. The shrouding arrangement and placement of the fan on the cold air side of the coil also helps to eliminate recirculation of air around the coil, a common detriment to efficiency in conventional blower evaporators. This helps to facilitate a complete sweep of air around the entire truck body.

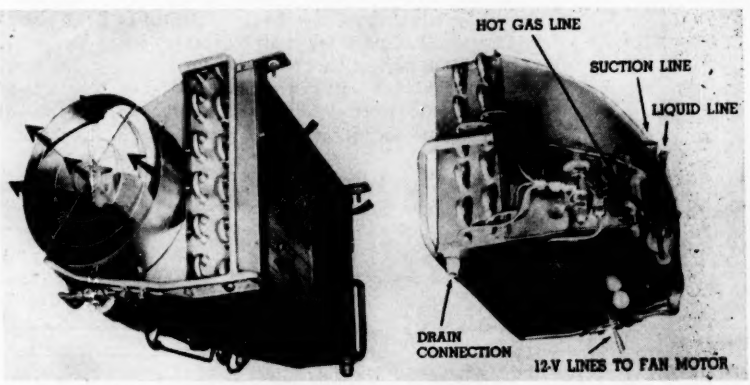
The blower evaporator normally is mounted on the ceiling in the left front corner of the truck. It is held in place on the ceiling by three stud bolts. Because of the shrouding design, there is no need for a bolt in the corner of the truck, making installations quick and simple.

New Scale Remover Marketed

MOST revolutionary development for scale removal, is a new product brought out by the North American Mogul Products Company of Cleveland, Ohio, called "Mogul Kwik-Kleen". According to the manufacturers it will remove the most hardened deposit of scale without damage to equipment, leaving the metal clean and bright. Since it gives off no corrosive fumes, there is no possibility of causing corrosion to other areas.

Another important thing about this new development is its safety to the operator (it is not necessary to use gloves, goggles or face masks). While the compound is powerful enough to remove the worse scale deposits, it is claimed that it will not burn holes in clothing or shoes, and will not cause irritation or discomfort.

"Mogul Kwik-Kleen" was developed for removing scale which would not respond to present normal methods, or where operation time was at a premium. The de-scaling operation is said to be quite simple. The product comes in measured amounts, in moisture proof bags, packed in drums. No weighing or measuring of the compound is necessary. It is recommended by the manufacturers for removing scale from evaporative coolers and condensers, shell-and-tube condensers, hot water heating coils, heat exchangers, compressor jackets, inter-and after-coolers, etc., which have scale interference with their operation.



Small model blower evaporator made by Kold-Hold Division Tranter Mfg. Inc., Left, front view. Right, rear view showing compound parts.

New Refrigerating Machine Improves Performance

A NEW single-stage hermetic centrifugal refrigerating machine called "Tonrac" which it is claimed features quieter, more efficient performance and completely automatic chilled-water temperature control throughout its full range of cooling capacity is now available from American Blower Corporation, Detroit 32, Michigan.

The machines are presently available for a tonnage range of 240 to 410 tons. Motor ratings are 250 hp and 300 hp, both suitable for 115 percent of rated continuous duty. Hermetic motors are presently available for 208, 220, 240, 440, 460, 480 and 550 volts; 3-phase, 60 cycles, 3-wire and 2-phase, 60 cycles, 4-wire current. Reduced voltage starting equipment is required.

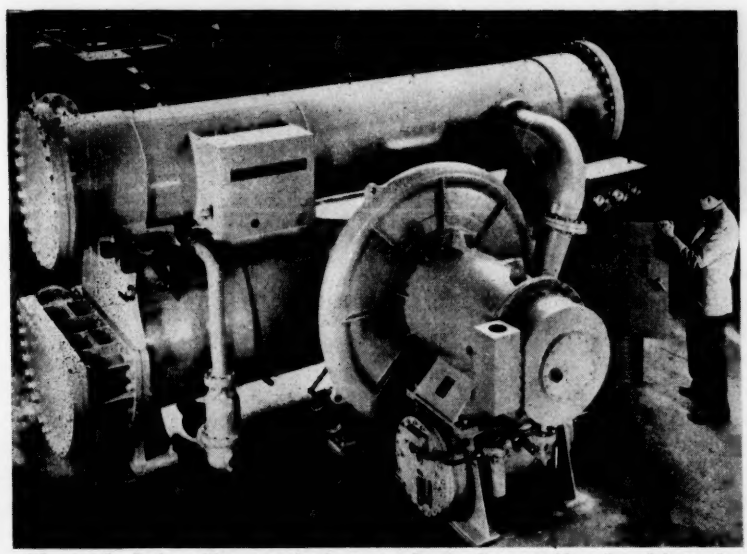
Tonrac's single-stage design according to the manufacturer avoids extra impellers, housings and connections and saves space and weight as well as installation and operating costs.

The single impeller is mounted directly on the motor shaft, eliminating the need for field alignment of rotating parts. Motors are standard water-cooled, hermetic, constant-speed (360 rpm) units. External transmissions or speed increasers are not required.

Hermetic construction provides complete enclosure of the motor-compressor assembly. No mechanical shaft seals are required, minimizing the possibility of refrigerant loss. Freon-113, refrigerant, is used in Tonrac.

Advanced design Tonrac features single-level construction. The supporting feet of the evaporator and the bottom of the compressor baseplate are at the same elevation, eliminating the need for stepped-up foundations. Tonrac can be installed anywhere in a building, from basement to roof; the only requirement is that the supporting structure be capable of carrying the unit's dead weight. Only three major components (evaporator, compressor and condenser) require field assembly. Tonrac can normally be installed by four men in a single week. All units are factory assembled and tested prior to shipping and all parts are match-marked to simplify field erection. Daily power requirements for Tonrac units are minimized by the automatic capacity control arrangement provided.

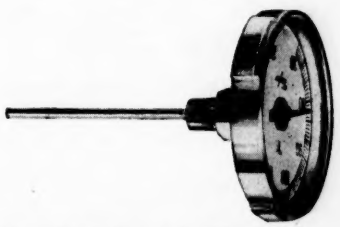
Once operation is initiated at the single pushbutton station, refrigeration capacity is automatically adjusted according to cooling need. Variable inlet guide vanes, located directly in front of the single impeller inlet, are automatically positioned to regulate the quantity, velocity and direction of refrigerant gas flow to the compressor in direct response to cooling load requirement. Guide vanes remain closed when starting until full speed is reached, providing no-load starting. Guide vanes are also closed and produce a virtual no-load condition for the drive motor when the cooling load is zero.



Advanced design Tonrac single-stage hermetic centrifugal refrigerating machine developed by American Blower Corporation.

Bi-Therm Dial Thermometer

A NEW bimetallic thermometer for a wide variety of applications is announced by Taylor Instrument Companies, Rochester, N. Y. Called the Bitherm Dial Thermometer, it is offered for such industrial and institutional services as pipe lines, hot water tanks, storage tanks, ovens, air ducts, bottle washers, food cookers, sterilizers, and many others.



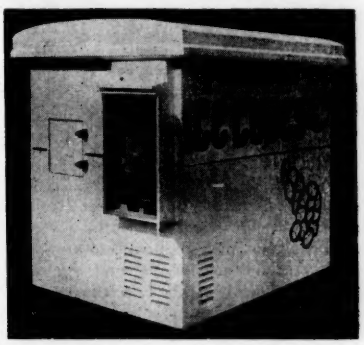
New Bimetallic dial thermometer, designed by Taylor Instrument Companies.

Easy to read, economical in price, rugged, and accurate within plus or minus one percent of range over the entire range, it is available with three or five inch dials and stem lengths of 4, 6, 9, and 12 inches. Separable wells of brass, steel, type 304 stainless steel, or Monel are available. Ranges of the various instruments run from minus 40 to plus 750 F.

Instruments are waterproof and mechanical connections are welded for greater toughness and reliability. There is no ambient temperature effect. Over-range protection is 50 percent up to 500 F and 10 percent above 500 F. All instruments, except for the unit having the 200 to 750 F. range, are silicone-damped against vibrations. This results in increased speed of response, absence of zero shift due to shock, minimum pointer vibration, and elimination of pointer chatter when the thermometer is handled.

New Ice Vendor Offered At Economical Price

AN ICE vending station with an economical price is being offered for sale by K. G. Brown, Mattituck, Long Island, New York. The outside dimensions are 6 x 8 x 7 ft. 8 inches. It comes equipped with time clock, thermostat, heating element for blower, pipe drain, lighting, lettering, loading door, counter, coin box, and hot gas automatic defrosting refrigerating unit, all standard equipment. Capacity is 85 ten-pound bags with storage space for an additional 250 ten-pound bags.



New Ice Vendor made by K. G. Brown

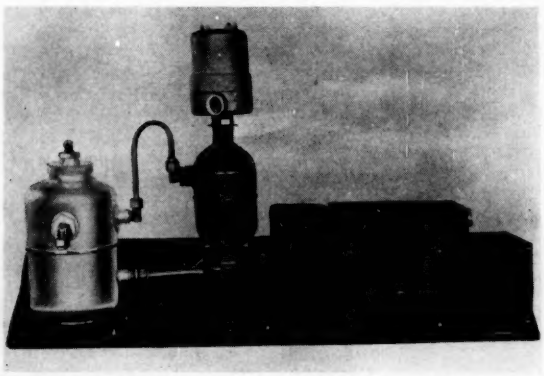
Develop Safe Acid Descaler

SULFAMIC acid, nicknamed "Industry's Housemaid", when compounded with an inhibitor and wetting agent is a most effective and personnel-safe scale removing agent. Bull & Roberts, Inc., New York City, has developed this crystalline substance as a result of available technical literature studies of several years and laboratory research of many months.

The product is marketed under the trade name of "H-400" Scale Solvent.The Sulfamic acid used in its production is a DuPont Chemical. Annoying scale deposits on sea water side of marine heat exchangers, plus a growing concern with accidents from mis-handling strong acid cleaners, lead to this "H-400" development.

Refrigotron Warns of Refrigerant Leaks and Other Loss of Power

A DEVICE known as the "Refrigotron," has been introduced by the Perfect Line Manufacturing Corp., Hicksville, N. Y., especially designed to warn both audibly and visually, loss of power, refrigerant leak, and undesired temperature change in refrigerated or air conditioned areas. The "Refrigotron" will forewarn of a refrigerant leak, two to five days (with average leak) before loss of refrigeration. It can be easily and economically adapted to all sizes and types of refrigeration and air-conditioning systems from 1/6 ton to 30 ton, and for larger sizes by special order. The device is engineered electrically for 115 volts, 230 volts, 440 volt single phase as well as 115 volt and 440 volt three phase.



The Refrigotron, designed to warn of loss of power, refrigerant leaks, and undesired temperature change.

One of the models indicates by light and gong that a refrigerant leak is prevalent. Another model indicates by light, loss of power, refrigerant leak or both, and can be adapted to a multiple service signal device either to outside telephone service or local system. A more popular model includes the above features which guards against undesired temperatures.

Most of the models are equipped with instruments which permits attachment of the "Refrigotron" to an answering service such as a fire-alarm or burglar system. Any failure due to power loss, refrigerant leak or undesired temperature change in the refrigerated area will immediately indicate a signal both on the premises as well as to the answering service or local alarm system.

This device has been under test for the past two years and has proven successful with F-12, F-22, and ammonia.

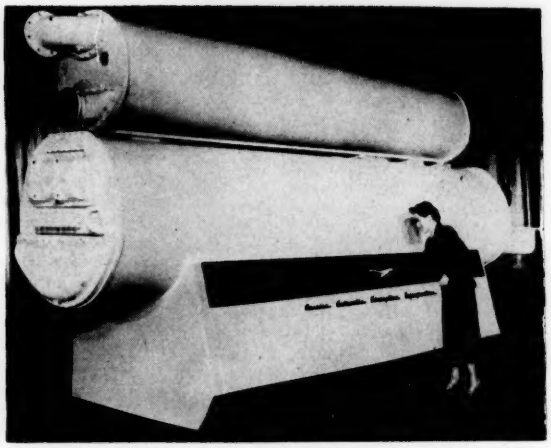
New Absorption Machine Provides Cooling From Steam

A NEW line of large capacity automatic "pushbutton" absorption refrigerating machines which produce chilled water from steam has been announced by Carrier Corporation. Available in a full range of sizes from 100 to 700 tons, the absorption units are used in air conditioning and process cooling systems. The machines have no major moving parts, and employ plain water as the refrigerant.

Overloading will not hurt the machine, is one of the claims of the manufacturer. In the event that cooling beyond design capacity is required, the machine will continue to operate, delivering additional tons of refrigeration, at a higher than design temperature level.

Due to the minimum number of moving parts and the light weight of the equipment, these machines can be installed on rooftops or upper-floor locations in office buildings, hospitals, apartment houses and similar structures. They can be placed high on the steelwork of an industrial plant close to the process where cooling is required. It is also suited to outdoor installation in any section of the country.

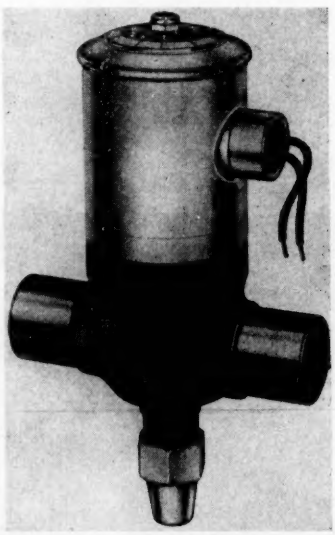
The machine is particularly economical, it is claimed, to operate wherever a low-cost source of heat, such as natural gas, is available to provide steam. Low pressure steam may also be obtained from back pressure turbines or from exhausts from various processing operations. This waste steam may be used to provide chilled water at little operating cost. Although steam is most generally employed, any hot fluid, such as hot water, oil or chemicals, may be used to generate cooling in this Carrier unit.



New automatic absorption refrigerating machine introduced by Carrier Corp.

Solenoid Valve Changes

THE SPORLAN Valve Company, St. Louis, Mo., has modified their line of solenoid valves in order to provide greater flexibility and increased capacity in their application and operation. The new line, introduced for the first time at the 9th All-Industry Show in Atlantic City, features the "Blue Seal Coil". This new, power-packed coil will be used on all models of Sporlan solenoid valves.



The new Sporlan Solenoid Valve featuring the Blue Seal Coil

Some models have been modified to provide for increased capacity and universal application for either F-12 or F-22. All of the pilot piston operated types have synthetic seating, instead of metal, in order to assure tighter closing.

In the interest of standardization, one mounting bracket may be used for the Types 12, 43, 53, 62, 73 and 172 (Solenoid Pilot Control). In addition, one coil — that of the Type 90 — may now be interchanged between the Types 33, 43, 53 and 83. New style, two-piece nameplates, allow for easy interchange of coils with different voltages.

New pipe insulation has vaporproof and fireproof finish for fast application

One fast operation combines application and finishing when you use Armstrong LT Cork Covering on cold lines. This entirely new kind of insulation is made of cork segments adhered to an aluminum foil and asbestos paper backing that seals out moisture vapor and resists fire. Application is amazingly fast. The paper flap is cemented quickly into place and end joints sealed with a vaporproof tape. Fittings are insulated with Armstrong Plasticork® or field fabricated covers of LT Covering.

LT Cork Covering is only one of the quality products in the complete line of Armstrong Industrial Insulations. Armstrong also offers you a contracting service, geared to install these products economically and efficiently.

Send for free booklet on LT Cork Covering or for information on other Armstrong products that can help you solve your insulation problems.

Armstrong

INDUSTRIAL INSULATIONS

☐ Armstrong LT Cork Covering, a New Cold Line Insulation

☐ Armstrong Armaglas* Insulations for Low-Temperature Rooms

☐ How to Select Low-Temperature Insulation

☐ Armstrong Insulcolor®, Weatherproof Coating in Seven Colors

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2002 Skye Drive
Lancaster, Penna.

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Please have an Armstrong representative call. ☐

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Position .....

Company .....

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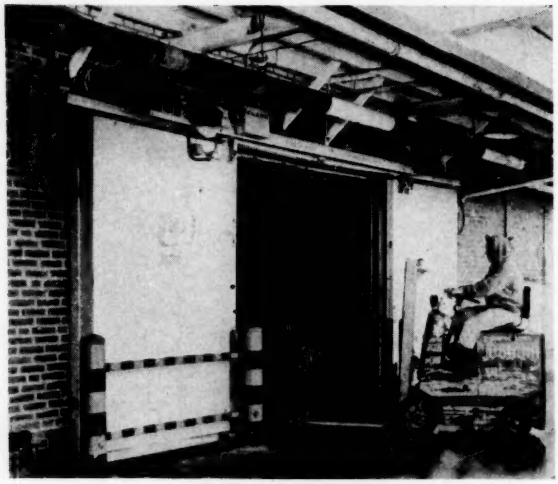
*TRADE-MARK

PREST-O-MATIC®
ELECTRIC COLD STORAGE DOORS



are FAST, SAFE and AUTOMATIC

Truck passage through doorways is completed in 8-10 seconds. Truck operator does not stop forward motion as doors open and close automatically by remote control. Electrically operated doors slide open or shut in as little as 2½ seconds. Safety edge opens doors automatically if closing upon obstruction.

Users report increased efficiency in moving goods —

"open-door-time" is reduced up to 75%, resulting in substantial savings in refrigeration and maintenance of lower temperatures.

PREST-O-MATIC doors are complete, packaged units, easily installed against any wall opening without loss of floor space. Full width of doorway is usable. *Send for complete information or consult your architect.*

FINE DOORS SINCE 1878 **CLARK DOOR CO.**

506 Hunterdon Street Newark 8, N. J.

PRESS BRIEFS

California Floods Inundate National Cold Storage Plants

REFRIGERATED warehousing in Northern California suffered in much the same manner in the recent holiday season floods, as warehouses did in two years previous in Kansas and New England. The National Ice and Cold Storage plant at Yuba City, California was inundated and damaged to the estimated extent of $100,000. M. W. Young, president and general manager of National Ice and Cold Storage of California, commented on Yuba City as follows: "Considering the overall picture, I think we were fortunate and insofar as I know, we were the only company that suffered any loss due to the floods.

"There was a tremendous loss of property in the Yuba City area. Some fifty-five people lost their lives and there was a tremendous loss of livestock. We had a five-room house that was formerly located five blocks from us deposited on our property, and an all-steel vendor, which weighs between 18 and 20 tons, was moved off its foundation and shoved ahead some 12 feet. Three of our large trucks were completely submerged and in our appliance display room the plate glass window was completely broken out and appliances floated away.

"The property is covered with 4 to 6 inches of mud or silt. Two National employees lost everything in their homes. Furniture floated out and, of course, with the flood, glued and veneer pieces just disintegrate. Fortunately at Yuba City, National had no product loss because it is just a precooler which is used during the fruit season; and the Marysville plant escaped without any damage or flooding whatsoever."

Replying to a question as to what part their association's played in the flood disaster, Jack L. Dawson, Executive Manager, Pacific States Cold Storage Warehousemen's Association, replied as follows: "Once again, the American Red Cross, together with the military, individuals, religious and other organizations, responded immediately to the aid of those affected by this diaster. I cannot truthfully say that the cold storage industry played more than a normal part in supplying foodstuffs to the displaced persons. In a disaster like this everyone stands ready with a helping hand to render what service he can to the less fortunate. With respect to the damage done to the cold storage industry, it is rather early to place a dollar-and-cents value on the damage".

Borden Buys Chemical Firms

THE capital stock of the American Resinous Chemicals Corp. of Peabody, Mass., and of Reslac Chemicals Inc., 3634 W. 38th, Chicago has been acquired by the Borden Co. In announcing the acquisitions, Augustine R. Marusi, Borden vice-president in charge of chemical operations, said they were made to further diversify Borden's activity in thermoplastics. There will be no changes in operating procedure or personnel.

The election of Theodore G. Montague as chairman and chief policy maker, and Harold W. Comfort as president, effective January 1 was announced by the Borden Company. Mr. Montague has been president since 1937 and Mr. Comfort executive vice-president since 1944. The post of chairman was eliminated in 1949. It was re-established in August, 1954 but had been vacant since then.

Apple Warehouse Roof Collapses

A SNOW-COVERED roof on the Peshastin Cooperative Growers cold storage warehouse, Peshastin, Wash., gave way and crashed with a roar down onto 20,000 boxes of loose-pack apples, causing a possible $75,000 in damages. The $60,000 building was finished only last month by a Yakima contracting firm. E. E. Soucie, coop manager, was in his office in an old warehouse next door when the mishap occurred. He said that two small boys came in to tell him that the roof next door was going down. He thought at first it was a prank, but investigated and found the roof had given way. The adjoining warehouse, built in 1919, was unharmed.

Crushing weight of the roof and ammonia fumes from the broken refrigeration system were expected to take a heavy toll of the stored fruit. A capacity of 80,000 boxes had been stored in the building a few weeks ago, but all but some 20,000 boxes had been moved out before the accident.

The building was a 100 by 100-foot structure of concrete tilt-up wall construction. Although the walls remained upright, some cracks from top to bottom developed in them. The roof was supported by bow string trusses.

Air Conditioning Record Predicted

ANOTHER record sales year will be established by the air conditioning industry in 1956 with a total retail volume of $3.2 billion, it was predicted in a year-end review by Cloud Wample, chairman and president of Carrier Corp. He estimated the industry's 1955 retail sales at $2.9 billion. As in the last three years, the biggest percentage gain in 1956 will again occur in the residential field, the air conditioning executive predicted.

"Sales of central systems which air condition the entire home rose from 50,000 installations in 1953 to about 75,000 in 1954 and 125,000 in 1955," Wampler said. He predicted that the spectacular gains in complete home air conditioning would bring profound changes in the residential heating business.

"The furnace industry already is being tightly welded into that of air conditioning," he pointed out. "The key phrase in furnace installations over the next few years will be easy convertibility. Heating is becoming—simply one phase of year round air conditioning," he said.

Freezers Join With Canners

FOOD freezing and canning industry organizations of the Northwest joined forces when the Northwest Frozen Foods Association voted to join with the Northwest Canners Association in a single organization. Canners previously had approved the merger.

The new organization will be called the Northwest Canners and Freezers Association. It will operate under a joint directorate until organization details are completed. The action brings together packers and freezers in Oregon, Washington, and Idaho which last year had a combined output of 533 million pounds of canned and frozen foods.

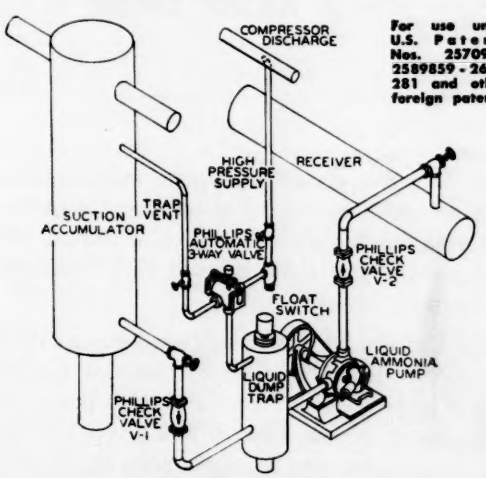
The Frozen foods association, 30 years old, was the oldest such organization in the county. The canners association was 43 years old. The action was taken, leaders said, for more efficient operation to assist the continued progress of the food processing industry in the region.

Ammonia "Slop-Over" Handled Automatically by PHILLIPS Liquid Return System

Protects Compressors, Saves Power, Makes Defrosting and Maintenance Simpler

Even in the best designed refrigeration systems, ammonia "slop-over" is a common occurrence. Two stage compression systems, booster systems and control ammonia compression systems subject to fast temperature and pressure changes are especially likely to have liquid in suction lines. This condition can seriously damage compressors which should handle dry gasses only.

Engineers at H. A. Phillips & Co. have devised a system that automatically returns "slop-over" directly to the receiver without regenerating and re-condensing the liquid. As shown in the drawing below, the Phillips Liquid Return System takes liquid ammonia which has collected in the accumulator, drains it through an outlet valve and check valve (V-1) into a liquid trap. Drainage occurs when the trap is at a low pressure. The trap is vented to the accumulator through a three-way valve and vent line. As the trap fills, a float switch is activated, energizing a three-way valve. This valve closes the vent line and connects the compressor discharge to the trap. Pressure builds up in the trap and closes check valve V-1. Pressure in the trap then reaches the same pressure as the receiver, opening check valve V-2 and allowing gravity to carry the liquid to the receiver. If gravity flow is not possible, a liquid ammonia pump is used. High pressure at both the pump inlet and outlet prevents flashing the liquid into gas. When the liquid trap is empty, the three-way valve is de-energized, closing the high pressure line to the trap. The trap is again vented to the accumulator, allowing liquid to drain once again into the trap.



Phillips Liquid Return System

For use under U.S. Patents Nos. 2570979-2589859-2641-281 and other foreign patents.

This arrangement is highly efficient since only one pound of compression gas is required to move 25 pounds of liquid. There is practically no loss of refrigeration potential of the recovered liquid. The system also permits oil flushed into the accumulator to be easily drained.

A number of "packaged" variations of this system in capacities to 1000-tons are available to handle all arrangements of accumulator and receiver locations. For full details, write . . .

PHILLIPS

H. A. PHILLIPS & CO.
DESIGNERS AND ENGINEERS
REFRIGERATION CONTROL SYSTEMS
3255 W. Carroll Ave. • Chicago 24, Illinois

3 CAT* DIESEL ENGINES REFRIGERATE FOX HEAD BEER

For almost eight years, starting in the spring of 1948, these three Caterpillar D8800 Engines have handled all refrigeration at the 250,000-barrel plant of Fox Head Brewing Co., Waukesha, Wisconsin.

The brewery had previously used steam. When the bulky boilers were replaced, the Cat Engines not only saved space but produced more power *and* flexible power as well. Each D8800 drives a 50-ton Frick ice machine, and the three units can be used singly or together, as required.

After long service the engines are still running smoothly and the chief engineer reports Fox Head is "very well satisfied."

For plants that need dependable power, the Caterpillar line offers diesel engines with outstanding advantages. The new D339, for example, delivers more horsepower than the D8800, yet is the same size and weight, with the same famous Caterpillar stamina and economy.

Your Caterpillar Dealer is a good man to talk to when you have a power problem. He can supply a full range of diesels up to 520 HP. And his excellent parts and service facilities protect the long, profitable work life that is built into them.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN HEAVY-DUTY DIESEL POWER

In the Spotlight

ECONOMY-MINDED management sometimes wonders just how practical tests and research conducted by their equipment building material and accessory suppliers, may be. Extensive research laboratory facilities often leave the customer executive with an impression that such facilities are reflected in the increased cost of purchases. Actually, such investigations, studies or tests under trained technicians result in extended life to equipment, premises and accessory lines. Convincing proof of investigative or research practice was given by H. C. Brown, Jr., before the 1955 NARW Convention. His complete and detailed report of sub-floor ventilation tests is given on page 13.

TECHNICAL papers were the high lights of the program presented at the annual meeting of the American Society of Refrigerating Engineers held in Atlantic City, December 1 to 3. Authors of these papers were some of the nation's foremost refrigerating and air conditioning engineers. In addition to the technical sessions there were conferences on domestic refrigeration engineering and new fields for mechanical coding. Summaries of the technical papers start on page 17.

MUCH UNWANTED heat is generated in the production of dyestuffs for the textile industry. In cooperation with a refrigeration machinery manufacturer, a prominent dye manufacturing firm devised a method of heat removal through installation of their own ice manufacturing and processing machinery. This process has been satisfactory and economical. It is described and illustrated in the article on page 20.

PRACTICAL ENGINEERS who fear replacement by automation will be interested in the article by Karl O. Werwath, starting on page 31. In the technological age (the age of automation), the practical engineer has the best opportunity to become the technician—the engineering associate. See "In Technological Age, Practical Engineer Trains for Associate Level". According to Werwath, an expert on technical training curricula, NAPRE, like the technical education institute or school, must expand its educational program to help fill an engineering void which has developed as the result of rapid technical expansion. Practical subjects should be augmented with training in the use of thought tools.

FROZEN FOODS again showed an increase for 1955 over the previous year and for each year except one since the early thirties, according to annual survey made by The National Frozen Food Distribution Association. It shows an increase of 10 percent over 1954 and per capita consumption was 45 pounds compared to 41 pounds the preceding year. See review of survey starting on page 22.

ICE VENDING is a part of the trend in modern merchandising which is creating vital changes in the buying habits of the American people. Based on this theme, the importance and opportunities of ice vending to the ice industry is discussed in the article on page 26.

A FELLOWSHIP has been established by The Refrigeration Research Foundation for deserving University students in honor of Dr. Samuel C. Prescott, chairman of the Board. For details see article on page 30.

SCALE DEPOSITS can now be removed without damage to the equipment and with safety to the operators, without use of gloves, goggles or face masks, according to announcements by two firms. The product resulted from years of experimentation and research. All practical details are given in the story on page 48.

AIR CONDITIONING of the Merchandise Mart, Chicago, already the world's largest for a commercial structure, has been increased with the addition of a new centrifugal refrigerating machine. For story and picture, see page 52.

REFRIGERATOR Manufacturers have been asked by the National Association of Frozen Food Packers to design a new multi-level frozen food case and thus help retailers sell more frozen foods. The packers contend that floor space limitations hold back increased displays on retailer's floors.

FRESH FROZEN Meat cuts, "packaged" by means of a thin coating of specially formulated microcrystalline wax which gives the product long-term protection and lends itself to economical application on automatic equipment, represents the latest merchandising phenomena to hit the retail meat trade.

MORE THAN ten percent of all refrigeration and air conditioning equipment produced in the United States are bought by the various departments, bureaus and commissions which make up the Federal Government, according to recent figures. The Air Force is the biggest buyer of all government agencies with an estimated $66 million a year.

FROM A retail dollar volume of $4.2 million in 1953-54, sales of chilled orange juice mushroomed to $23.8 million in the 1954-55 season. Sales estimates for the season just starting point to a volume of $43.4 million.

there's an L of a BIG DIFFERENCE

in the NEW KRAMER THERMOBANK

Here are the major improvements

A NEW HEAT SOURCE - Instead of using only the sensible heat of the THERMOBANK, the new "L" THERMOBANK now utilizes both its sensible heat plus its latent heat of fusion by actually freezing a tube of ice around its reevaporator coil during the defrost. (The "L" stands for latent). This, coupled with significant improvements in the design of the reevaporator coil, gives the "L" THERMOBANK four to five times more heat storage for instant defrost and complete reevaporation.

NO LIQUID REFRIGERANT TO COMPRESSOR - With the vastly larger amount of heat now available in the "L" THERMOBANK, no liquid can return to the compressor during defrost. This is a singular and distinctive feature of the "L" system vastly different from any other automatic hot gas defrost system now available.

CONSTANT CRANKCASE PRESSURE - The "L" system maintains a predetermined low crankcase pressure, thus permitting the use of standard low temperature compressors without danger of motor overloading during the defrost, or oil foaming upon resumption of the refrigeration cycle. The low temperature compressors are less costly since they deliver more Btu's per horsepower.

NO EXTRA SUPERHEAT DUE TO REEVAPORATOR - On larger systems the suction line by-passes around the THERMOBANK during normal operation, thus eliminating any superheat pick-up from the bank by the suction gases during normal operation. This is very important with F-22.

"LOW-LOW" TEMPERATURES - Extremely low temperatures are now achieved with the "L" THERMOBANK and a complete line of "Low-Low" systems are now available.

NO WINTER PROBLEMS - The "L" THERMOBANK can be housed in an unheated space, thus making possible the use of the "L" THERMOBANK in any location, even the arctic circle.

KRAMER TRENTON CO. • Trenton 5, N.J.

Testing Facilities For Refrigerated Warehouse Construction

H. C. BROWN JR.
Armstrong Cork Company
Research & Development Center
Lancaster, Pa.

RESEARCH investigations associated with cold storage structures may not deal with factors of vital importance in the day by day operation of refrigerated warehouses, but it is believed that all of them in the final analysis have some bearing on building and operating costs. Even though solutions to some of yesterday's problems have apparently been found, research nonetheless is continuing to find even more efficient and more economical ways of doing things.

Sometime ago a rather unique facility was constructed at Armstrong Cork Co's Research and Development Center, for testing insulated structures. It had been felt for years that there was a real need for obtaining certain data on refrigerated buildings pertaining particularly to heat flow through insulated walls, floors, ceilings and various structural members. Although exceedingly good work had been done in developing laboratory methods of measuring thermal conductivities of insulations most accurately, there was some question as to whether these values would be the same, and would remain the same, when the insulation was actually installed.

For example, the effects of air convection, increased moisture content of insulation, open joints, etc. were not known, and it was difficult if not impossible to make such measurements on small scale equipment. Moreover, to make such measurements in the field with any degree of accuracy at all was not feasible due to fluctuations in temperature, humidity, and air velocity both inside and outside the structure, due to operations.

This unique test facility (see Fig. 1) consists essentially of a test building built within an outer building. Such arrangement enables complete control of variable factors in the interior and exterior of the test building. The inner (test) building is a room approximately 20 ft square with a ceiling height of 10 ft, while the outer circular building is about 50 ft in diameter. Temperatures in the inner room can be cycled from minus 100 to plus 200 F., or maintained at any level within this range. Likewise the outer room temperature can be cycled or held constant at any temperature from 0 to 160 F. Room temperature can be maintained at an accuracy of about plus or minus 1 degree F. In either room the humidity can be controlled from a low level to essentially saturation, or maintained at any intermediate point.

Paper presented at annual Convention National Association Refrigerated Warehouses.

Cascade Refrigerating Plant

Refrigeration is accomplished by a "Freon-22" three-stage compression system using "Freon-11" as the heat transfer medium to the air cooler in each room. Control instruments and a 160 point recording potentiometer for thermocouple readings are located on the instrument panel. Over 500 thermocouples, representing some eight miles of lead wire, have been extended from various locations in the inner and outer room to the recording instrument. A jack panel permits instant switching to any 160 of the over 500 couples.

In addition to heat flow studies of insulated walls, some results of which have already been published,[1] there have been other investigations which are significantly important to refrigerated warehouse construction. Although it is true that many of these studies are incomplete, and it is impossible to present conclusive data at the moment, knowing about some of these studies may be of interest to the industry.

[1]Brown, Jr., H. C. and L. E. Bish: Effect of Convection and Moisture Deposition on Heat Transmission Through Cold Storage Test Walls; Refrigerating Engineering Vol. 62, No. 1, p. 62, January, 1954.

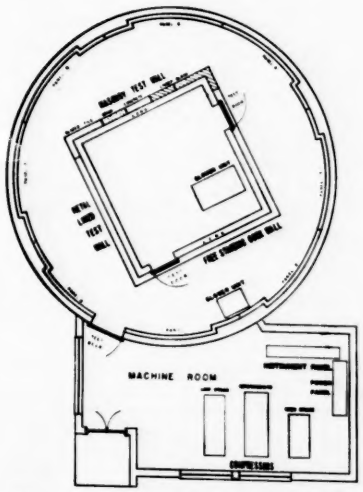


Fig. 1 — Plan, dual testing facility, Armstrong Cork Co., Lancaster, Pa. Temperature ranges: interior structure, minus 100 to plus 200 F; outer shell (circular) 0 to 160 F.

One phase of the work which has been going on for some time, and incidentally one in which some data is available, is on-grade freezer floor ventilation. One recommended method of providing ventilation beneath the freezer floor (which has been used in numerous instances with success) is shown in Fig. 2. Function

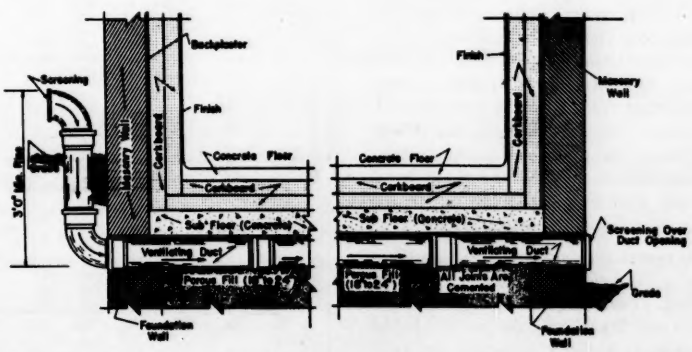


Fig. 2 — One type of sub-floor ventilation system for freezers built on-grade. Note that duct inlet is raised above outlet, and both above grade.

of such ventilation is to apply heat beneath the freezer floor by drawing warm outside air in the duct on one side of the freezer and exhausting the cooled air on the other side.

It stands to reason that if the heat liberated by the air passing through the duct is the same as that transferred through the freezer floor, the subfloor temperatures should remain constant. Rather than present a theoretical analysis of how such a satifactory ventilation system was arrived at, or for that matter even the results of test room studies, of greater interest would be data obtained from an actual installation made almost eight years ago.

corkboard insulation and a 4 in. concrete wearing floor. It should be noted that sets of thermocouples were installed at five different locations beneath the floor, each set consisting of one thermocouple directly beneath the concrete wearing floor with four more below spaced one foot apart. Efforts were made to install the thermocouples with great care so reliable readings could be obtained. The lead wires were connected to a convenient terminal board located inside the room.

The north end of each duct discharged directly to a basement area while the south end in each case was connected to a riser. Although not indicated on the sketch, when the freezer was first operated, ventilation in both ducts was by natural air movement only. The relatively cold air in each duct poured out to the basement area drawing warm, outside air down the risers and into the ducts. It was this "reverse stack effect" that was relied upon to introduce heat beneath the freezer. One of the ducts was connected at a later date to a blower which drew warm room air from a heated second floor. The direction of flow was such that the air from the heated room passed beneath the freezer and was discharged to the atmosphere through the opopsite end of the duct.

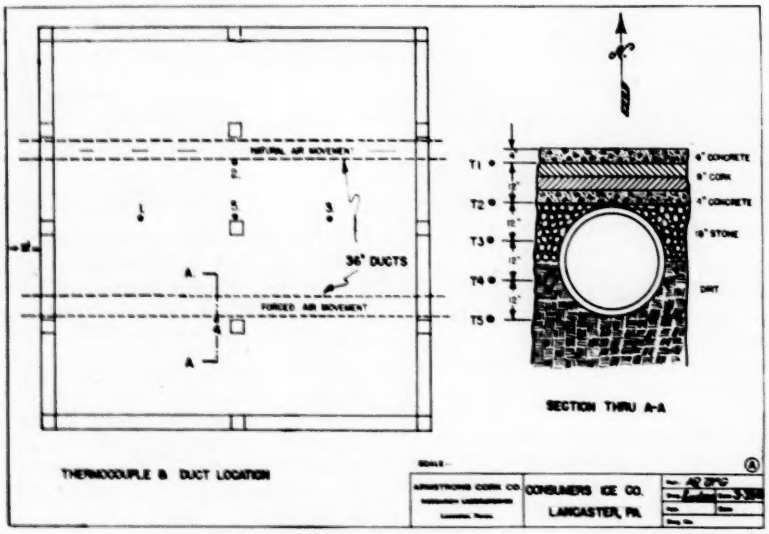


Fig. 3 — Sub-floor duct arrangement and thermocouple locations, Consumers Ice Company, Lancaster, Pa.

Freezer Floor Ventilation

The freezer in reference is located at the Consumers Ice Company in Lancaster, Pennsylvania. The original structure, diagrammatically sketched in Fig. 3, was operated as a cooler for many years before being converted to a freezer without any added floor insulation. After one or two years' operation as a freezer it was noted that frost heaving had started. In time it became so bad that it was necessary to put the freezer out of operation, to remove the floor completely, and to dig out the entire ice saturated fill and earth.

A ventilation system and construction as indicated in Fig. 3 was installed. Two 36 in. diam. concrete ducts on 20 ft. centers were placed as shown, directly beneath the subslab level. An 18 in. stone fill was poured between ducts followed with a 4 in. concrete sub-slab, 8 in. of

Thermocouple Locations

Thermocouple locations No. 1 and No. 3 are midway between the ducts and in the center of adjacent bays. It is evident that readings at any elevation at Location No. 1 should be about the same as at a similar elevation at Location No. 3.

Location No. 5 is near a footing under an interior column midway between ducts. It is to be expected that this location would indicate the effect of an interior column on subfloor temperatures. Locations No. 2 and No. 4 are adjacent to the ducts as shown, and indicate the difference between natural and forced air movement.

From thermocouple reading at Location No. 1, (Fig. 4) it will be noted that the freezer first went into operation in the early part of July, 1947. The initial set of thermocouple readings were taken the following September 8, and showed all tempera-

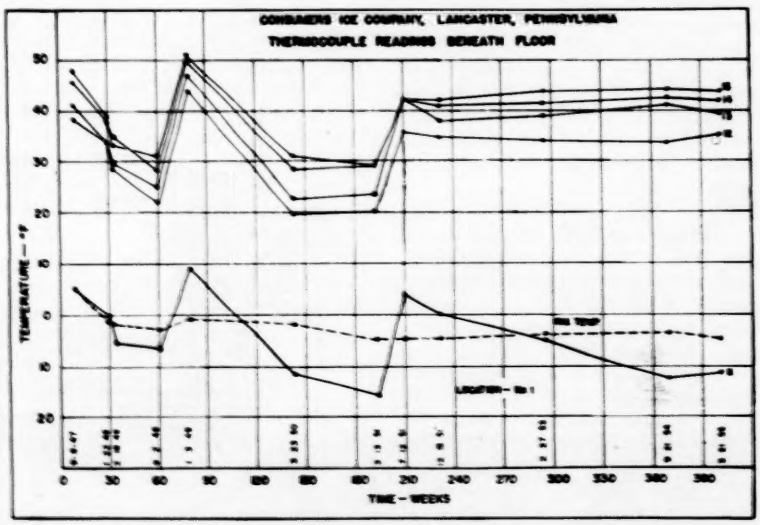


Fig. 4 — Thermocouple readings, location No. 1, were taken from the left center bay of the warehouse shown in the floor plan in Fig. 3.

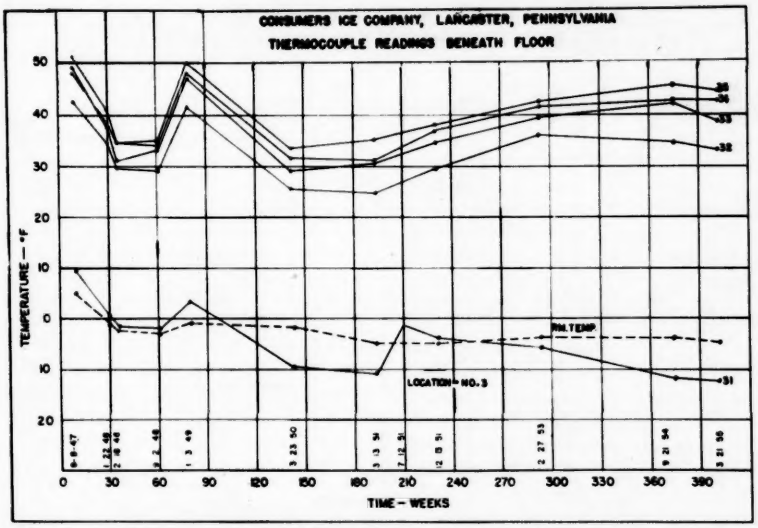


Fig. 5 — Thermocouple readings, location No. 3, taken at center of floor in right-center warehouse bay. Numbers at right of each plotted temperature correspond to the thermocouple location; that is, 31 would represent location 3, sensing bulb 1, just under the finished floor slab. (See section A-A, Fig. 3.)

tures beneath the sub-slab well above freezing. However, readings taken on the following January 2 and February 18 indicated that temperatures were still decreasing and were below freezing at least one foot down.

Personnel Interrupt Tests

Although at the time it was thought that we were perhaps measuring the effect of the winter months, when readings taken the following September 2 were even lower and showed freezing conditions three feet down, it indicated that something was definitely wrong. Upon investigation it was learned that personnel working in the basement area had found the draft exhausting from the ducts so uncomfortable that they completely closed the end of each duct by propping a piece of roofing felt over the discharge end. Thus flow of air and consequent heat input beneath the freezer floor had been stopped permitting ground temperatures to decrease further and further.

Resumption of ventilation resulted in sufficient heat input. By January 3, 1949 the temperatures at Loc. No. 1 had climbed to a 44 to 51 F. range. Note that this temperature rise took place in the Fall and early winter!

Decreased thermocouple readings at Loc. No. 1 found in March 1950 and again in March 1951 can be attributed once again to an interruption of air passage through the ducts. One of the ducts was closed off with roofing felt as before. The other, where a blower had been connected, was inoperative because the blower was disconnected during the time. Natural ventilation could not occur in this duct, not so much that the blower offered resistance to the flow of air, but the risers at both ends prevented discharge of air from the duct.

After steps were taken to prevent interruption of air movement, the temperatures at Loc. No. 1 rose to a safe 36 to 42 F. range. It is of great interest that the readings have varied little for the past 3½ years, and in no case have dropped below 33 F. It is apparent that equilibrium conditions have been attained, and there is no reason to believe that any further change will occur in the future if air is allowed to pass through the ducts. It is significant that the readings have been substantially the same over the past 3½ years whether taken in the Fall and Spring.

Readings at Loc. No. 3 (Fig. 5), as would be expected, are very similar to Loc. No. 1. The temperature fluctuations at both locations, due to the same factors, almost coincide. The flattening out of each curve above 32 F. since mid-1951 again is good assurance that the subfloor temperatures will never be low enough for frost to form.

Column Conducts More Heat

Examination of the thermocouple measurements at Loc. No. 5 (Fig. 6) discloses that the temperature at each level is somewhat lower than corresponding readings at Loc. No. 1 and No. 3. This is unquestionably due to the conductive effect of the column at Loc. No. 5. The 29 F. minimum reading is of no particular concern because the temperature one foot beneath is well above the freezing point, and apparently has leveled out over the past three years. Any frost deposit near the column would be expected to be, and to remain, inconsequential.

A comparison between readings at Loc. No. 2 and No. 4 (Fig.'s 7 and 8) clearly shows the greater heat input of forced warm air. The advantage of bringing sub-floor temperatures from below freezing to above more rapidly in the case of forced warm air is counteracted by greater stability of natural air movement, and even more particularly by producing subfloor temperatures consistently and

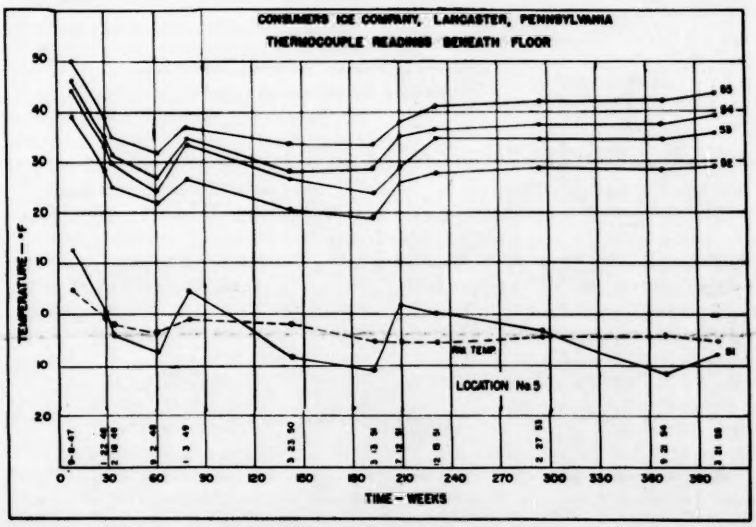


Fig. 6 — Thermocouple readings, location No. 5, taken at column in center of the freezer room.

only slightly above 32 F. It is obvious that the data indicates minimum floor heat leakage in the case of natural air movement.

Natural and Forced Circulation

Comparison of the natural and forced circulation is even more graphically illustrated in Fig. 9 where only those thermocouple readings immediately beneath the sub-slab at each location are plotted. The effect of the greater fluctuation and higher temperatures resulting from forced warm air is apparent. Likewise, the column conductive effect is most evident at Loc. No. 5 as indicated in the consistently low readings of Thermocouple No. 52. Readings at Loc. No. 2 (Thermocouple No. 22) near the natural air duct show the same degree of stability as at Loc. No. 1 (Thermocouple No. 12) and No. 3 (Thermocouple No. 32) midway between ducts.

As mentioned, this study at the Consumers Ice Company was conducted on a freezer floor ventilated with two 36 in. diameter ducts spaced 20 ft. apart. Similarly, readings have been made on systems where smaller ducts spaced closer togther have been used with equally satisfactory results.

This article will be continued in March.

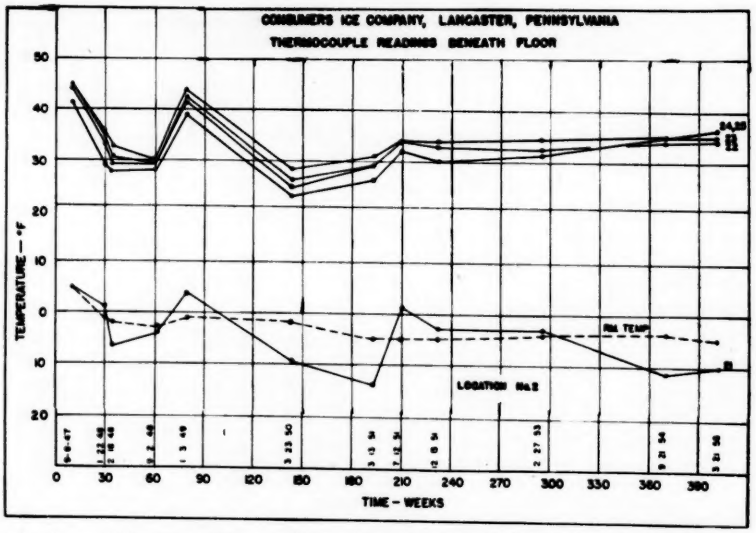


Fig. 7 — Thermocouple readings, location No. 2, indicating temperatures at various levels near the natural air vented duct.

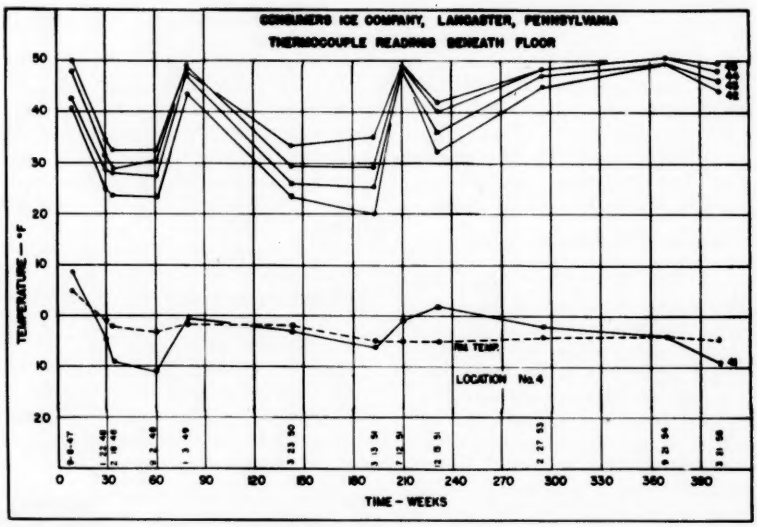
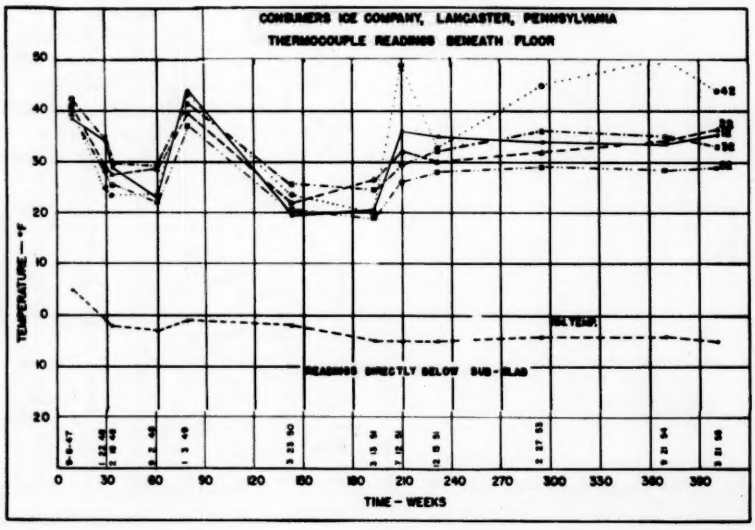


Fig. 8 Right — Thermocouple readings location No. 4, taken at forced air duct from similarly placed sensing units as in Fig. 7.

Fig. 9 Below — Composite record of thermocouple readings taken directly beneath sub-slab.



Date Storage

REPORTS from the date storage study of TRRF aided at Pomona, Cal. under the direction of Dr. G. Leonard Rygg show that dates with a moisture content of 25 percent or a little higher, a common range, keep satisfactorily for one year at a constant temperature of 32 F, if stored promptly in the fall. A higher temperature is likely to result in excessive darkening and loss of flavor. Dates transferred to 80 F remained in good condition for two weeks, but should not be allowed to remain longer on store shelves without refrigeration.—TRRF Information Bulletin.

Technical Papers Highlight Annual Meeting American Society Refrigerating Engineers

A DIVERSIFIED technical program featuring some of the nation's foremost refrigerating and air conditioning engineers was presented at the 51st Annual Meeting of The American Society of Refrigerating Engineers held in Atlantic City, N.J., December 1 to 3. Running parallel to the technical sessions were conferences on Domestic Refrigerator Engineering, and the New Fields for Mechanical Cooling.

Heat Transfer

In a paper on Heat Transfer at Simulated Altitudes, W. L. Holladay, Holladay & Westcott, Consulting Engineers, Los Angeles, Calif., briefly reviewed the problems of heat transfer in a temperature altitude chamber and the analytical and experimental work on refrigerant film transfer, fin efficiency, and air side film factor.

Charts were presented for estimating temperature difference between fin surface and refrigerant, with corrections for refrigerant temperature; for estimating air side film factor at velocities from 100 to 10,000 fpm, altitudes from sea level to 100,000 ft, and fin spacings from four to 12 per inch. Relation for coil effectiveness was derived and charts were presented for coil effectiveness for several fin spacings. Radiation was discussed and probable rates of radiation heat transfer were calculated.

Cascade Refrigeration Systems

A paper on Cascade Refrigeration Systems for Ultra-Low Temperatures was presented by D. J. Missimer, Pacific Refrigeration Company, Los Angeles, Calif. The author explained that two stage cascade systems utilizing "Freon-12" or "Freon-22" in the high stage and "Kulene-131" or "Freon-13" in the low stage may be used in equipment cooling air or other media with an evaporating refrigerant range from approximately −135 to +55 F depending upon refrigerant selection and design of the system. The lowest temperatures possible are limited primarily by the maximum compression ratio allowable and by the control devices.

A number of methods are available for operating cascade systems at even higher air or product temperatures. These methods are: (1) limiting maximum evaporator pressures and operating with a high temperature differential across the evaporator; (2) operating with a high evaporator temperature (pressure) and preventing overload of the low stage compressor by various means; or, (3) using the high stage only connected to a secondary evaporator.

Generally standard components, including evaporators, expansion valves (except for charge), compressors, oil separators, and heat exchangers, may be used throughout without modification. The cascade condenser, used to transfer heat from the low to high stages, is somewhat special. An expansion tank or other similar devices are necessary to limit stand-by pressures in a "Freon-13" system to a reasonable maximum.

The advantages of a cascade system for producing ultra-low temperatures are that standard components operating at ordinary pressures may be used and rather simple refrigerant control devices employed.

Deterioration of Cellulose

The Reaction Between Electrical Insulating Paper and Monochlorodifluoromethane, was discussed in a paper by H. M. Elsey, Westinghouse Research Laboratories and L. C. Flowers, Westinghouse Electric Appliance Division.

The authors pointed out that paper and other forms of cellulose are widely used as electrical insulating materials in hermetic refrigerating motors. Accelerated aging tests of these materials at both 257 and 302 F show that cellulose deteriorates many times faster when it is heated in an atmosphere of monochlorodifloromethane than when tested in the presence of dichlorodifluoromethane.

Cellulose is rapidly embrittled by the monochlorodifluoromethane after which it gradually changes in color to a dark brown or black. The damaging effect of traces of anhydrous acids on cellulose are well known and it is concluded that this refrigerant splits off hydrogen chloride which is picked up by the cellulose which acts as an acid acceptor.

The experimental procedures used were described in some detail. A tentative mechanism for the formation of hydrogen chloride from monochlorodifluoromethane was suggested. The experiments are thought to be of particular interest since, unlike cellulose, most organic electrical insulating materials deteriorate faster in the presence of dichlorodifluoromethane than in the presence of monochlorodifluoromethane.

The Variation of Thermal Conductivity

The Variation of Thermal Conductivity with Temperature of Insulating Powders was presented in a paper by Peter E. Glaser, Arthur D. Little, Inc. and Carl F. Kayan, Head of Mechanical Engineering Department, Columbia University.

They presented the principle of design of an apparatus and associated instrumentation to measure thermal conductivity under transient conditions. The basis for the experimental procedure is the measurement of a small temperature rise at a point in an infinite solid due to a continuous line source. This had been accomplished by placing the test material in a cylinder surrounded by a controlled temperature bath with an electrically heated wire at the center cylinder. A graphical record of a small temperature rise in the test material due to the heater, as sensed by thermocouples located at radial distances from the heater, was obtained and thermal conductivity calculated from this data. The test material was diatomaceous earth. Tests were carried out in a range from 70 F to 300 F, using several gases and pressures. The over-all accuracy and reproducibility of the test results was estimated to be two percent.

Vapor-Ventilated Insulation In Freezer Warehouse

A Field Evaluation of the Performance of Vapor-Vented Insulation In A Large Freezer Warehouse was described by E. R. Queer and E. R. McLaughlin, Queer & McLaughlin, Consulting Engineers. A new concept in cold storage freezer wall design, they said, is the insulated dry wall which is free to breathe to the interior cold space and is protected by a vapor barrier on the warm side. These principles of water vapor behavior have been well established by laboratory observations, they pointed out. This paper describes an installation of instrumentation in a cold storage warehouse and summarizes

observations of heat transfer and water vapor movement.

Heat flow observations and thermal conductivity calculations for the insulation are quite consistent with laboratory observations. Conductivity values average 0.22 Btu in./sq ft, hr, deg F at a mean temperature of approximately 40 F. Temperatures in the walls are steady and temperature profiles are uniform. The incidental entrance of rain into the roof insulation and its subsequent migration through the construction verifies the vented wall concept. At the temperature differences encountered in this study the need for convection barriers within the insulation is doubtful. The density of the insulation is sufficient to prevent convection of any consequence.

Water Sorption

A study of the Water Sorption Characteristics of Silica Gel, Activated Alumina, and Anhydrous Calcium Sulfate was described by Walter O. Walker, Dean, Division of Research and Industry and James B. Hostettler, University of Miami, Coral Gables, Fla.

For some time, they stated, there has existed doubt as to the reproductibility of zero-adsorption points, both for the same sample of desiccant and for several samples of the same batch. In addition, there was a controversy as to whether it was correct to use zero-adsorption points in expressing the percentage of adsorbed moisture. Since solution of these controversies was required before a final standard for desiccants could be written, research was undertaken to settle the issues involved.

The results of the research work are summed up in the following conclusions:

(1) The zero-adsorption point for silica gel is reproducible after repeated activation-water exposure cycles, either at atmospheric pressure or under vacuum.

(2) The zero-adsorption point for activated alumina is not reproducible after repeated activation-water exposure cycles, either at atmospheric pressure or under vacuum. This indicates the formation of a new phase.

(3) The zero-sorption point for anhydrous calcium sulfate is less reproducible than that of silica gel after repeated activation-water exposure cycles, either at atmospheric pressure or under vacuum.

(4) There is no significant difference in the reproducibility of the zero-sorption point for atmospheric activation as compared with vacuum activation, except for activated alumina.

(5) The zero-sorption point and the ignited weight point can be consistently reproduced.

(6) Since the zero-sorption point represents a true starting point from which the percentage of adsorbed water may be calculated, it is preferred over the ignited weight.

An extensive bibliography containing 1,541 references was compiled during the course of the investigation. Due to its size, the bibliography was not published as a part of this article. However, it is available, on loan, from The American Society of Refrigerating Engineers.

Comfort Cooling for Hogs

The results of a study of the economic feasibility of providing a partially controlled environment for hogs in the field were presented by W. E. Fontaine, F. N. Andrews, W. L. Sibbitt, Purdue University, C. E. Glackman, International Harvester Co., and S. J. Williams, Jr., Whirlpool-Seeger Corporation.

Swine were chosen for this study because they do not sweat at all. During periods of sustained high ambient temperatures they are subjected to extremely high heat stress. These periods of high heat stress result in a decrease in growth and a decrease in the efficiency of feed conversion.

Feeding experiments at Purdue University during the summers of 1947 and 1948 indicated that fluctuations in feeding efficiency were related to temperature. In these experiments, carried on under normal field conditions, feeding efficiencies decreased as much as 54 percent whereas the normal decrease due to increased weight would have been only about 12 percent. If the decrease in feeding efficiency that occurred as a result of temperature could have been eliminated, the weight increase would have been approximately 15 lb. per swine and the feeding period would have been reduced to less than 100 days.

The engineer considers animals as machines which produce heat in proportion to their metabolic processes and activity. The machine is always running and it has a low thermodynamic efficiency; therefore it gives off heat even when the animal is at rest. When the air and surroundings are warmer than the skin temperature, this heat cannot leave the animal by direct flow to the air. Under these conditions swine can only dissipate heat through the evaporation of water from the lungs. If heat production is greater than heat loss then overheating occurs and if the condition persists, efficiency decreases, followed by collapse and in extreme cases of heat stress death occurs.

Since heat transfer by conduction, convection and radiation are reversible processes, it is thought that a partially controlled environment will help to maintain body temperature close to the optimum without changing the physiological reactions in any way which might interfere with the animal remaining on full feed.

It is proposed that a suitable environment may be obtained by means of a slab cooled by mechanical refrigeration. Based on a number of conservative estimates and heat transfer assumptions it was found that a slab of 500 sq ft will probably accommodate a herd of 50 to 75 swine. For this size herd a 2-hp condensing unit would be needed. A detailed cost analysis is included in the body of the paper.

Heat Transfer Rates

A paper on Heat Transfer Rates From Heated Horizontal Tubes To Dichlorodifluoromethane was presented by Merl Baker, Associate Professor of Mechanical Engineering, University of Kentucky. Tests were conducted with dichlorodifluoromethane boiling within the horizontal tube and salient factors varied over the following range.

Refrigerant temperature	58 - 85 F
Temperature differential	9 - 16 F
Weight of flow	40 - 200 lb. per hr.
Heat flux density	2789 - 8350 Btu hr. -1 ft -2
Average quality	10 - 60 percent

A formula was given from which a calculated value could be obtained. These values were compared with measured test values. Deviations, in percent, were depicted in a table, showing a range of minus 8 to plus 12 for the conditions given above. Tubular data was arranged in groups for comparative purposes. It was observed in general that an increase in flow rate gave a negative deviation, and a decreased flow gave a positive variation from that predicted.

Boiling Point and Range of Refrigerants

In a paper on Determination of Boiling Point and Boiling Range of Refrigerants, W. H. Decker, L. B.

Smith, and A. D. Turissini, Research Laboratories General Chemical Division, Allied Chemical & Dye Corporation, discuss the errors and difficulties inherent in the procedures and apparatus currently used for this determination. A new and simple apparatus was described that effectively eliminates these errors and can be used at any temperature from subzero up. Experimental data were given, comparing the older methods with the new one, over the temperature range of −40 C to +24 C. A low temperature thermometer, using a thermistor as the sensing element and accurate to ±0.05 C with a very rapid response was also described. Charts giving the boiling point correction as a function of barometric variation were included for dichlorodifluoromethane, trichloromonofluoromethane and monochlorodifluoromethane.

Condensation of Freon-12 In a Horizontal Tube

A research program designed to accumulate information on the condensation of "Freon-12" in horizontal and inclined tubes was initiated by ASRE in cooperation with the Kansas State College Engineering Experiment Station. A paper by Richard C. Potter, Asst. Dean, and Surendra P. Patel, Graduate Research Assistant Dept. of Mech. Engineering, Kansas State College, presented results obtained to date on this project. Film heat transfer coefficients for condensing "Freon-12" were determined for a range of variables attainable with the present equipment. For heat fluxes of about 8,000 to 18,000 Btu/hr ft² the film heat transfer coefficient varied from about 300 to 600 Btu/hr ft² F. The variation of the film heat transfer coefficient with the temperature difference between the condenser surface and the vapor followed the theoretical variation, i.e. an increase in temperature difference would increase the rate of heat transmission and thus the thickness of the condensate layer, and since heat flows through the condensate film by conduction, the coefficient should decrease. An increase in vapor velocity results in an increased film heat transfer coefficient.

The results obtained were suitable as guidance data in design but of course must be substantiated by additional research and experimentation. A theoretical analysis of this complex process has not been made and additional study and research is necessary before this can be done.

Conference on New Fields For Mechanical Cooling

At the Conference on New Fields for Mechanical Cooling, December 2, papers were presented on: "Environment, Comfort, Health and People; by Prof. H. K. Fahnestock and Dr. Jane E. Werden, University of Illinois; "Relative Energy Exchange and Body Temperature Regulation in Cattle and Man, 50 to 150 F Ambient Temperature", by Dr. Samuel Brody, University of Missouri; "The Effects of Climatic Environment on Swine", by Prof. F. H. Andrews, Purdue University; "Effect of Environment on Chickens", by W. O. Wilson, University of California.

Conference on Domestic Refrigerator Engineering

At the domestic refrigerator engineering conferences December 2, papers were presented as follows: "Built-in Refrigerators and Freezers," by F. L. Tarleton, Hotpoint Co.; "Planning the Kitchen", by Glenn H. Byer, Cornell University; "Designing Built-ins", by Peter Muller-Munk, Peter Muller-Munk Associates; "Selling Built-ins", by Kenneth Cook, AVCO Mfg. Co.

Pacific Coast Packer Buys Minnesota Freezing Plants

THE PURCHASE of Fairmont Canning Company properties in Minnesota by Stokely-Van-Camp Inc. last December (1955) marked entry of this firm into food freezing east of the Rockies. Acquisition of the Fairmont plant, Stokely-Van Camp officials said, was made to permit its Pictsweet division to produce its own requirements for the ever expanding volume of frozen pies.

Stokely's frozen foods plants presently are located in the Pacific coast states with the exception of the citrus concentrate plant in Florida. Fairmont Canning operated three plants, two at Fairmont and one at Winnebago, Minn.

Commenting on acquisition on the Fairmont plant, Stokely officials said: "The Fairmont plants are located in Minnesota, fourth largest producer of poultry in the nation. Poultry is a principal ingredient of frozen meat pies". In recent months, the volume of sales for frozen pies processed by Stokely has steadily increased.

A substantial portion of the Fairmont facilities can be used in the production of frozen meat and fruit pies, which will be scheduled, so as to permit year around plant operation. They have been previously operated on a seasonal basis. Stokely plans to complete the installation, as soon as possible, of modern pie freezing facilities.

Present Operations Will Continue

C. J. Meister, vice-president and general manager of the Fairmont plant said that the operation of the company as a subsidiary of Stokely-Van Camp, Inc., "will continue in the name of the Fairmont Canning Company, that present operations and personnel will continue," and that "further operations are projected to be on an expanded basis". The Fairmont Canning Company had net sales of $7,507,939 in the fiscal year ended March 31, 1955 and net sales of $7,275,000 in the seven months ended October 31, 1955.

The acquisition was effected by an exchange of Stokely-Van Camp, Inc. 5 percent cumulative convertible voting 2nd preferred stock of a par value of $20 per share, for all of the outstanding capital stock of the Fairmont company. The 2nd preferred stock is a new class created at the annual meeting of the Stokely-Van Camp, Inc., stockholders last October. The stock will be convertible into 5 percent cumulative prior preference $20 par value stock in a share-for-share basis.

Frozen Lamb From New Zealand

FROZEN lamb in consumer size packages is being tried in the United States by New Zealand meat concerns. Over 40,000 pounds of chops and boned roasts are being marketed experimentally here by two major down-under meat packers. An official from one of these firms says: "New Zealand leg of lamb retails in England for about 35 cents a pound. The same cut is 70 cents here. Even with a 3 cents-a-pound tariff, we should be able to compete with domestic lamb.

Plan Conversion To Frozen Foods Plant

THE unused Cudahy Packing Plant at Sioux City, Iowa, may be converted to a food freezer plant. David Greenberg, St. Paul, Minn., said he and a group of associates had bought the plant for a sum in excess of $300,000 and may build a freezer operation on the 16-acre plant site, after razing the present buildings.

Refrigeration Expedites Dye Manufacturing

MUCH unwanted heat is generated in the production of dyestuffs for the textile industry. Heat removal methods vary with the dye manufacturer, but applications could be summed up as jacket-cooling, pipe-cooling or by ice — either direct additions or by latent-heat solutions. The Hilton-Davis Chemical Co., Cincinnati, Ohio uses ice, which they believe to be the most practical method.

Ice for Hilton-Davis dye processes for many years was purchased from a local block ice manufacturer. Although the block ice so obtained was a quality product, there were certain inconveniences of deliveries and sizing. The ice in proper size was not always obtainable at the process location when the foreman needed the material. Suppliers were cooperative but the sizing and deliveries on random calls was neither economical for the ice manufacturer nor for the chemical firm.

Enterprizing refrigeration man, C. P. Wood, Cincinnati, recognized the disadvantages and set about to convince Hilton-Davis' purchasing department that their own ice manufacturing plant in a process or sized ice would economically solve their problems. His plan was to supply block ice in convenient size for use directly in dye processing, yet of such a size that it would still be useful in latent heat storage tubs scattered about the chemical plant acreage.

The ice making plant as finally engineered and installed, provides an 80-ton storage bin which is elevated. A company high-level dump truck is used to distribute the ice from this super-size hopper to points in the plant, on demand by the various process foremen. This facility provides a reserve of ice which is easily transported by the chemical company employees and vehicle at the time and place that its use is needed.

Equipment Supplied

Principle pieces of equipment supplied for the super-contained ice plant are:

Two 30-ton horizontal Vilter Pakicers complete with accessories and a press for No. 2 briquettes. One of these Pakicers is pictured in Fig. 1.

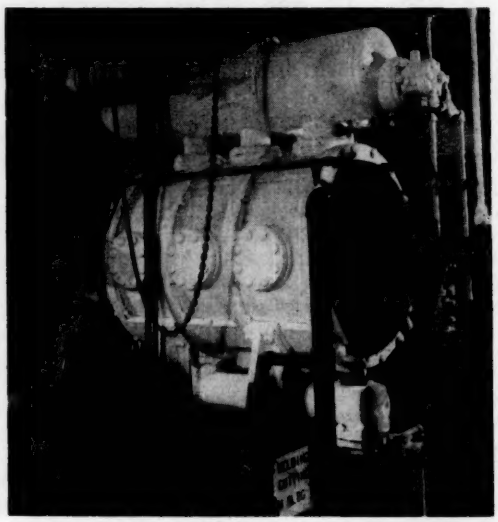
Two V-belt driven Vilter VMC ammonia compressors operating at 810 RPM (See Cover Picture).

One 20 in. diameter × 14 ft. ammonia receiver with ammonia stop valves, gauge glass, dual safety valve assembly and stands, and two evaporative type ammonia condensers including headers to connect gas inlet and liquid outlets plus necessary valves, made up the high side of the Pakicer system.

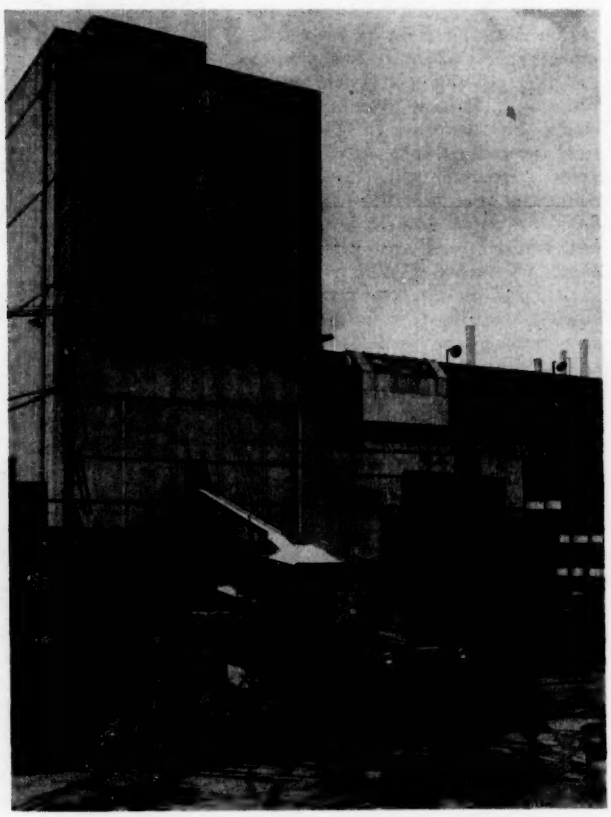
One 4 × 4 in. self-contained condensing unit with a 10 hp, 1750 rpm, 220/3/60, high torque type squirrel cage motor, across-the-line type starter, automatic water valve and belt guards, plus one cooling unit with accumulator, internal float control and connections, made up the principal components of the storage refrigeration system. Cooling coils are 10 row with 3 fins per inch. Motor is 220/3/60.

The high side equipment and the Pakicers are located on the ground level of the plant. As the ice is produced, a bucket elevator is used to convey it to the overhead 80-ton storage bin. This bin is (Fig. 2) equipped with a Vilter chain unloader and ice is chuted to the high lift dump truck which conveys the briquettes to the various points of

(Continued on page 49)



Above 30-ton Pakicer used by The Hilton-Davis Chemical Co., Cincinnati, to produce ice for dyestuff processing. Two such units are employed in their daily operations.



Right: Building of cement asbestos exterior which houses an 80-ton vertical ice storage bin at The Hilton-Davis Chemical Co., Cincinnati. Pakicers, compressors, condensers, receivers and associated equipment are located at the first floor level.

Photographs Courtesy of The Vilter "Booster". Vilter Mfg. Co., Milwaukee, Wis.

"To build and equip this Quick Freezing and Cold Storage Plant, we have drawn upon the best skill and knowledge of the industry, so that in every essential phase of its structural and operational facilities, it represents the most seasoned and experienced craftsmanship known to quick freezing and cold storage authorities."

ALBANUS PHILLIPS, JR., President
Phillips Packing Company, Inc.
Cambridge, Maryland

Why Phillips chose York . . .

***When Phillips Packing Co.*, the nation's second largest frozen food processor, decided to add 12 million pounds of below-zero storage capacity, York got the job. Here's the story:**

Early this year, Phillips Packing Co., known for foods of quality since 1902, decided to build a new refrigerated warehouse that would double their below-zero storage capacity. York was awarded the contract to install the new 110-ton system.*

Why? There were many reasons. York's unequalled experience in the refrigeration field for one. Since 1885 York has been headquarters for mechanical cooling of all kinds.

Another reason was the dependability of York equipment. Phillips' original Quick Freezing and Cold Storage Plant used—and still uses—York Evaporative Condensers, York Booster and High-Stage Compressors, a York Liquid Recirculating System, a York Automatic Continuous Freezer, and York Ice Plant and Ice Storage Facilities.

In other words, Phillips knew York quality from their own experience. So their new warehouse uses York Evaporative Condensers, High-Stage Compressors and High and Low Pressure Receivers.

Why not put York's custom-engineering service in the frozen food field to work for you? Just call your York District Office (the number's in your classified phone book), or write York Corporation, York, Pa. There's no obligation, just plenty of sound information and practical help.

**Consulting Engineers: V. C. Patterson & Associates, Inc.*

YORK CORPORATION

York refrigeration air conditioning

the quality name in refrigeration

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

Frozen Food Sales Gain Again in 1955

SAM VOGEL
President National Frozen Food Distributors Association

AGAIN, as in every year except one since food was first commercially quick-frozen in the early Thirties, the frozen food business in 1955 showed a comfortable sales gain over the preceding year. Our Association's annual survey indicates that a total of 7.5 billion pounds, edible weight, of frozen foods were consumed during the year, an increase of 10 percent over 1954. Per capita consumption was 45 pounds, compared to 41 pounds the preceding year and to only 17 pounds just six years ago in 1949.

Huge Increase in Six Years

This gain of 160 percent in sales in just six short years has spelled out a real revolution in food merchandising at the retail level. Few in the industry conversant with the retail situation would question the statement that a grocer who is not now doing 5 percent of his total business in frozen foods has fallen behind the times. Many of the one-store independents did better than that in 1955 as did most of the chains. When this steady-growth condition is projected ahead on the known and expected sales increases, it seems reasonable to assume that frozen foods will become 10 percent of all grocery store business within a very few years. This would earn for them the rank of third place among grocery products, outranked only by meats and fresh produce.

Prepared Foods Leads

Virtually all of the frozen foods shared in the 1955 sales gain but the outstanding performers, undoubtedly, were the prepared frozen foods — mainly of the heat-and-eat variety. Pot pies are the leaders among these and, indeed, they now outrank all other items in the frozen food cases in dollar sales with but one exception — orange juice. The 1955 sales of the pies was in the neighborhood of 150 million pounds. This is an estimate, since there are no accurate figures for prepared food production and sales — a situation that will be corrected within a few months when the U.S. Dept. of Agriculture reports on a production survey that it is making among all packers. Lacking these precise figures, the following estimated 1955 sales totals have been procured from leading packers:

1.	Pot pies	150 million lbs.
2.	Potato products*	100 million lbs.
3.	Fish sticks	67 million lbs.
4.	Complete dinners	50 million lbs.
5.	Waffles	20 million lbs.
6.	Fruit pies	15 million lbs.
	Other	223 million lbs.
		625 million lbs.

* Mainly french fried potatoes.

Because of the rapid strides made by the prepared foods in 1955, this category is now ranked in 4th place among the frozen foods. The comparison:

1.	Vegetables	1,031	million lbs.
2.	Poultry	900	million lbs.
3.	Fruit Juices	829*	million lbs.
4.	Prepared foods	625	million lbs.
5.	Fruits	531	million lbs.
6.	Seafoods	384**	million lbs.
7.	Eggs	341	million lbs.
8.	Meats	250	million lbs.

*This is store weight. Reconstituted, or edible weight, was 3,410 million lbs.

**If 67 million lbs. of fish sticks, included under prepared foods, are added to the seafood total, that industry's frozen food sales come to 451 million lbs.

As a foot note to the strong showing made by prepared foods, it should be mentioned that 1955 was the year when quite a surprising assortment of Big Names from elsewhere in the grocery business declared themselves on the deal. Through mergers with existing prepared food packers, the following companies entered the field during the year: Campbell Soup Co., Carnation Co., Continental Baking, Surf & Co., Pet Milk and Consolidated Grocery. Heinz and Aunt Jemima also entered the field, but with their own brands.

Vegetables

This category has been the industry's leader since the end of the war, when it displaced fruit in that position. And vegetables still rank first, but by a narrowing margin. Their sale in 1955 came to 1,031 million pounds, or only slightly more than the 1,030 pounds sold in 1954.

There were two reasons for this disappointing showing: short packs in several items and consequently higher prices and the ferocious competition among all of the frozen foods for space in inadequate store cabinets. Peas, which in recent years have been the No. 2 frozen food in dollar sales, outranked only by orange juice (and now by pot pies) were in short supply all through 1955, as were also broccoli and cauliflower. The outlook for 1956 is similar: possible shortages of peas, broccoli and cauliflower, with sweet corn added to that list.

Congestion in Cabinets

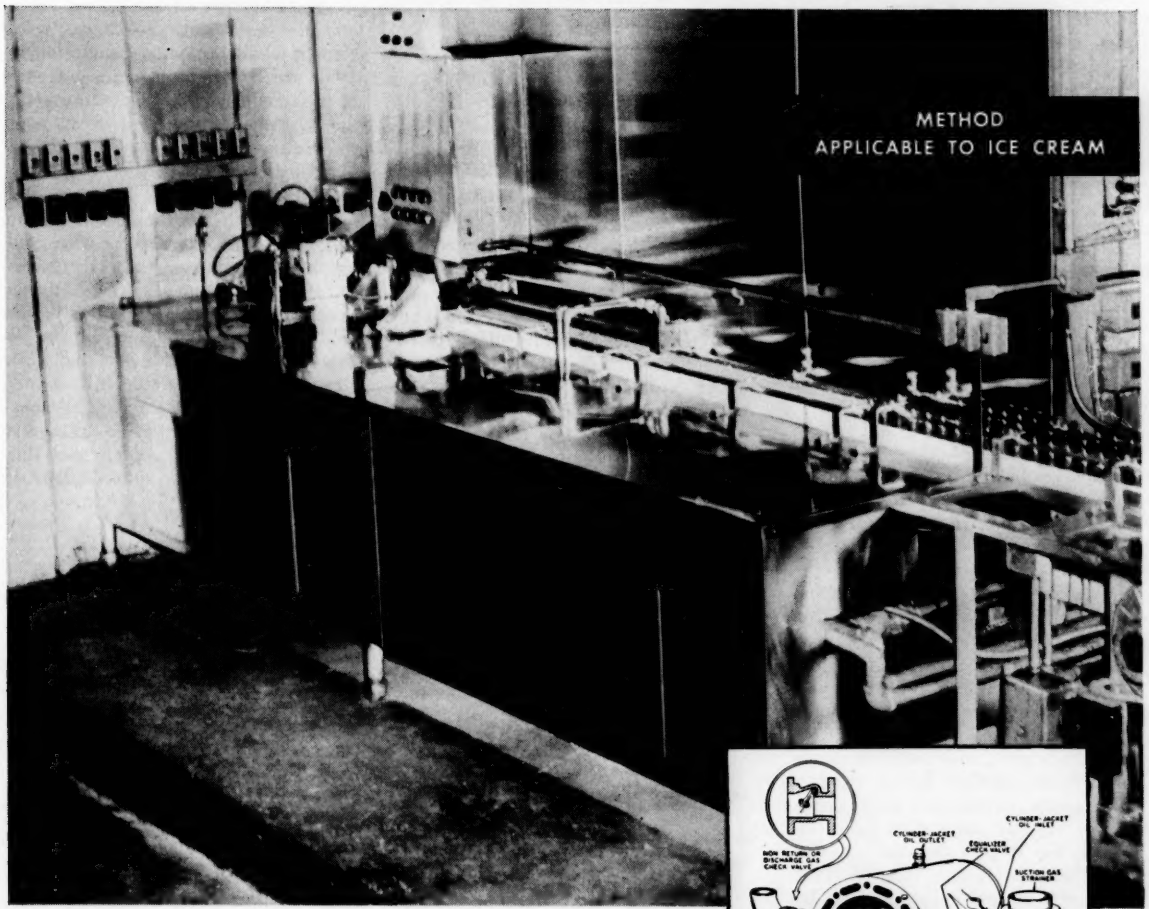
The congestion in cabinets — another factor in static vegetable sales — was felt in varying degrees by all of the frozen foods. Cabinets have been an inbuilt hurdle to the expansion of the frozen food business since the beginning. The fact that shelving for most other foods sold in the grocery store costs $1 a foot to install, but that frozen food cases cost $100 a foot, has created a very real, although constantly rising ceiling that limits the rapidity of growth of the business.

Sometimes that ceiling seems lower than at other times. And the industry, at the moment, is passing through a growth phase that makes it seem very low indeed. This is not because the retailers have stopped buying new cases; the installation rate is probably higher now than ever before. Rather, it is the result of a flood of new prepared foods that have gone into the cases in recent months. These have squeezed down the space left for vegetables, and other frozen foods, with a consequent limitation on their sale.

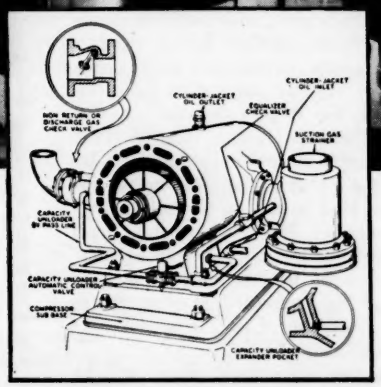
An encouraging sign is that the frozen food industry recognizes this situation and is doing something about it. The fruit and vegetable packers, through their association, have collected a fund to finance a research program which has as its goal the development of a practical, multi-level display cabinet. This is needed badly because the limiting factor in the expansion of the frozen food department in many of the smaller stores is floor space. In such stores there's no more room for the department to grow side-wise; it must grow up. While this long-range program is underway, the packers are seeking accurate cost-movement-margin figures (something long needed by the industry) which are expected to prove to the retailer that existing cabinets, even though priced at $100 a foot, really are bargains when the profit potential of the frozen food business is taken into account.

Continuous Freezing of Retail Cartons at Rate of 180 per Minute Requires Only One Operator

at Fairmont Canning Company, Winnebago, Minn.



Frozen food packages entering the Freezing Equipment Sales continuous freezer from high-speed filler. Compact insulated room freezes 24,690 12-oz. packages at one time. Only the product enters and leaves the room.



Fairmont Canning Company selected F E S -Fuller Rotaries to provide a flexible two stage refrigeration system capable of matching a variable refrigeration load. Fairmont's battery of Plate Frosters, loose product Belt Freezer and continuous Package Freezer are served by F E S -Fuller Rotaries under varying refrigeration requirements from 3" to 10" Hg. Vacuum.

Compactness and simplicity of design make F E S-Fuller Rotary the most popular refrigeration booster. Rotary principle of gas compression insures high efficiency at large gas volumes to give compact and light weight machine generally smaller than the driving motor. Absence of suction and discharge valves, connecting rods and crankshaft give a simplicity in design which guarantees low maintenance cost and quick overhaul if any plant shutdown is necessary.

Whatever *your* refrigeration requirements, turn to service-proved F E S-Fuller Rotary Booster.

Write for more information.

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1973
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FREEZING EQUIPMENT SALES, INC., 423 WEST MARKET ST., YORK, PENNA.

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LOW TEMPERATURE FREEZING EQUIPMENT

Fruit Juices

Judged by the history of the past six years, the concentrated fruit juices have been, by a wide margin, the industry's star performers. The growth gain for that period was 700 percent. Orange juice, with 1955 sales of 65.9 million gallons (9.9 lbs. to a gallon) is the leader among the concentrates. Lemonade, whose sales are only a seventh of those of orange juice, is in the second place:

Concentrate Consumption in Millions of Gallons

	1955	1954
Orange Juice	65.9	60.3
Lemonade	9.6	8.1
Grape Juice	4.0	3.1
Lemon Juice	1.2	1.0
Grapefruit juice	1.5	1.7
Blended juice	0.6	0.9
Tangerine juice	0.9	0.4
	83.7	75.5

Because orange juice is so important among the juices, the Florida orange crop (from which all except 1 to 2 million gallons of the pack comes) is always watched with interest. This crop has averaged out over the past few years to a size rather nicely balanced with demand, but because it varies widely from year to year the industry has come to expect a shortage situation in some years and over-supply in others. The crop now being picked (harvest will continue through June) will probably come to 91 million boxes. Such a crop would permit a Florida pack of only slightly more than last year, if that. So it is fairly certain that prices will be higher than in 1955 and that a normal expansion of sales will not occur — at least not to the extent that would be possible with a larger crop. Nor is there any relief from this situation expected in 1957 because the Florida crop is now in one of its downward rhythm swings and a reversal of the swing will take another year at least.

On the other hand, there will be plenty of lemonade because the California lemon crop, from which this pack comes is in a chronic state of oversupply. How sales of lemonade will go in 1956 depends on next Summer's weather and the extent of promotion. The 1955 Summer was a hot one and sales forged ahead of the previous year by 18 percent. The year before that saw a cool summer and sales were 1 percent behind the preceding year. Prices in 1956 will depend on the growers' decision in the matter, because California law permits them to allocate the supply of fruit.

Seafoods

After sinking to a post-war consumption low in 1953 — when competitive beef could first be described as low-priced — the seafoods business is looking up. Sales of the frozen product during 1955 totaled 450.7 million pounds, a gain of 25 percent over the preceding year:

Frozen Seafood Consumption in Millions of Pounds:

	Fish Sticks	Fillets	Shellfish	Total
1955	66.6	203.1	181.0	450.7
1954	47.3	184.8	127.7	359.8
1953	6.0	219.7	119.8	345.5
1952	-	245.2	129.7	374.9
1951	-	245.8	123.4	369.2

Fish sticks are generally credited with being the salvation of the fishing industry. Two years ago the sale of this item was only 6 million pounds. In 1955 sales soared to 66.6 million. The effect of this has been two-fold; a diversion of cod, haddock and perch, the raw material for sticks; from an oversupplied fillet market and, at the same time, a reawakening of buying interest in the other seafood items. That is a phenomenon common to merchandising. If there is one "hot" item in a line that attracts the customers, more of the other, associated products may be sold by placing them alongside the fast mover. Such, apparently, has been the case in seafoods.

Shrimp, the leading shellfish item as usual, followed its own peculiar marketing pattern. The price and sales curves for shrimp have always resembled fever charts and 1955 was no exception. At the beginning of the year the carryover inventories were at an all-time high and prices were low. But 1955 sales proceeded at such a furious rate that they ran far ahead of production and inventory, at the year-end, was trimmed back close to the danger point. This, of course, was accompanied with price increases which are expected to curtail consumption. When, and at what price (and if) a balance between production and consumption will be achieved is something that members of the shrimp industry would very much like to know.

Fruits

Fruits are a peculiarity of the frozen food business in that roughly three-quarters of the pack never reaches the cabinets in the retail stores; this portion goes to restaurants and to pie bakers, preserve manufacturers and ice cream makers for use as raw material. Another oddity is that fruits were frozen before there was a Clarence Birdseye or a quick-frozen food industry. Indeed, there was a sizable pack of frozen fruits as early as 1918. Because of their long history, fruits are at the same time the most mature of the frozen foods and the most static as far as sales growth is concerned. Consumption in 1955 was 531 million pounds, a gain of 6 percent over the preceding year, but a gain of only 30 percent over the seven-year period from 1948. During that same period, vegetables gained 130 percent in sales.

The three fruits important to the retailer — strawberries, peaches and raspberries — all were ahead in sales in 1955, although gain for strawberries, the leader, undoubtedly was held down by a short pack in the preceding year. However, the 1955 strawberry pack, which will supply the market until packing recommences next May, was a generous one of 270 million pounds and this popular fruit is once more in plentiful supply.

Meats

The big news in frozen meats lies not in what has happened but in what may happen. In the early days of the industry meats were an important part of the frozen food line. At a time when the Birds Eye brand enjoyed more than half the market, the Birds Eye line of frozen steaks, chops and roasts were both extensive and a volume seller as sales were measured in those days. Because of shortages during the war, Birds Eye discontinued the line, leaving the field to a number of small companies whose products were mainly meat specialties such as chip steaks, patties, etc. Since then frozen meat volume has been small when compared to other frozen foods — and still is.

But several things happened in 1955 that lead many thoughtful executives in the frozen food industry to wonder if meats aren't headed for the No. 1 position. A tremendous tonnage is involved in the meat business — some 26 billion pounds carcass weight in 1955 — and if only a modest percentage of this was marketed in frozen form, the present leaders among frozen foods would be displaced.

Swift & Co. furnished a clue to packer thinking last summer when it test-marketed a complete line of frozen steaks, chops and roasts in Detroit. The intent was to find out how such a line would sell in competition with fresh meats at the nec-

(Continued on page 49)

Nuclear Radiation An Aid Not a Substitute For Refrigeration

THE Sterilization of foods by nuclear radiation isn't just around the corner. This popular belief was shattered by Dr. Leonard Reiffel, supervisor of nuclear physics at Armour Research Foundation of Illinois Institute of Technology, Chicago.

"There has been a great deal of talk about radiation sterilization," he said in a year-end statement, "but the hard facts are that it doesn't look possible for the near future, at least. And for one good reason," he added. "Radiation sterilized foods taste, smell, and look terrible!"

"Certainly one of the most exciting possibilities of the 'atomic age' is the sterilization of foods by radiation," declared the physicist. "If this could be achieved, refrigeration would be a thing of the past and storage life of meats and vegetables on ordinary pantry shelves would be very long indeed."

What does seem possible, according to Reiffel, is radiation pasteurization—killing most, but not all, the bacteria. This requires much less radiation, does not destroy food quality, and still lengthens storage life under refrigeration. "In other words," he said, "one can expect processes using a combination of mild irradiation and refrigeration to be a really important upcoming contribution of nuclear technology to man's well being."

Although this is not as spectacular as meat lasting forever at room temperature, it is considered a tremendously important advance. Radiation retarded spoilage will present fewer shipping problems, provide a supply of seasonal foods throughout the year, and enable greater utilization of surplus foods. "This is possible right now with present knowledge," Reiffel stated, "and 1956 should see actual trials of the method for some products, at least."

Cooling Underground Retreats

AN important segment of Swedish industry has been going underground for safety in case of atomic war. One problem has been to cool such plants, because machines, lamps and people develop more heat than the rock will carry off. Axel Fredrik Rosell of Djursholm, near Stockholm, who received Patent 2,727,365 for a subterranean air-conditioning system, says that merely pumping in cold air is unsatisfactory because it creates troublesome drafts.

His method is to run cooling coils through the ceiling, or through both ceiling and walls, so as to lower the temperature without making an artificial breeze. Fresh, cool air is also supplied but in moderate volume. Instead of using technical refrigerating systems, the inventor says it may be possible to pump lake water through the ceiling and walls.

Fire Damages Canadian Ice Plant

FIREMEN sluiced down a $100,000 icemaking plant after fire threatened an explosion in the factory of the Lake Simcoe Ice and Fuel Company, Toronto, Canada. There was no immediate estimate of the damage and firemen said cause of the fire was not known. The fire occurred in a two-story refrigeration plant behind the factory at Dupont Street and Davenport Road in mid-central Toronto. Hundreds of employees in the main five-story factory remained on the job. A company spokesman said the action of firemen in pouring water over the pipes minimized the danger of explosion, keeping the pressure down.

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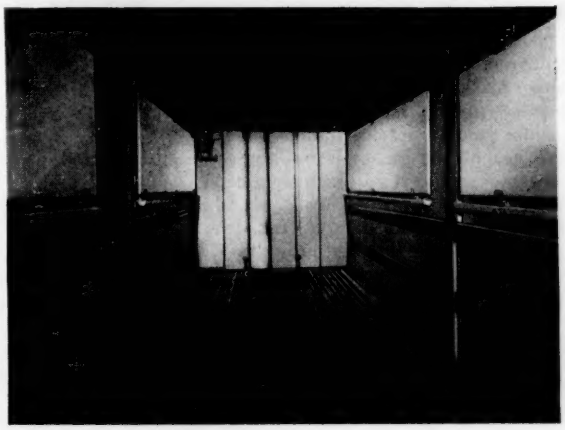

In sizes to fit any application. May be installed in a horizontal position suspended from the ceiling, in a vertical position along the walls, or as a partition. Can carry eutectic solutions ranging from −59° to +26°.

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Ice Vending—A Trend of Modern Merchandising

GLEN M. BRONSON
Refrigeration Engineering Co., Montgomery, Minn.

A VITAL change is taking place in the buying habits of the American people. And to the alert ice man this offers a clear challenge to gear his selling operations to meet these new buying habits. To such an ice man the question "Will ice vending fit in with my selling plans?" will be a natural.

This change in buying habits is apparent everywhere; the modern super-market in the food field; self service in the hardware and drug fields; gasoline service stations where the car owner can wait on himself with a self-service, coin-operated pump; ice vending stations open 24 hours a day, seven days a week. It's popular because there's no waiting, and in some instances, particularly the ice industry, it extends the time during which service is available.

The change in ice merchandising may be imperceptible to the ice man who stays closely within the four walls of his own business. A gradually decreasing volume may be taken for granted. Holding his own in sales volume may assure him he's getting along all right. A slight increase may bolster a self-satisfied feeling. But he will be unaware of the great opportunity for progress that he's missing through not recognizing the newer merchandising ideas of making it easier for the customer to buy.

Getting New Business

Sometimes a competitive neighboring ice company speeds up the time of his decision by installing some ice vendors. Although his own business may rock along without his losing any volume, he may learn that his competitor has created a volume of new business that could just as well have been his had he been on his toes.

Another thing that can jolt him is to have a brand new competitor come into the area with an ice making machine and a battery of ice cube vendors and build a new business right under his nose. There's ice business in every area that the present ice man can have, merely by taking it. But if he doesn't avail himself of it, someone else will.

The most difficult fact for the established ice man to realize is that more ice business can be created out of present markets. It's easy to believe though it isn't true, that an ice company, operating with old merchandising methods, is getting all the business there is. The ice man who feels that he's getting all the business available, and that ice vending would only split the volume of distribution is not thinking in accordance with facts, as many experienced ice men can testify.

This vendor located on a main highway and also close to very good residential section, catches both transient and residential trade. This is a double unit, vending crushed ice on one side and cubes on the other.

In practically every location where ice vendors have been installed, much new business has been developed over and above the old established volume. Ice is bought and used where it wasn't bought and used before. Being available twenty-four hours a day has made sales during hours in which the old ice man never operated. Ice cube and crushed ice users simply went without when they knew it wasn't available.

Proper Placement Important

Proper placement of ice vending machines at strategically selected points will sell ice twenty-four hours of every day. It invites business by making ice convenient for customers to buy. It provides ice for new users in modern day living.

People in general are similar. They all respond to about the same kind of impulses. A study of many thousands of people tell us what a certain number, out of every hundred, will do when they pass an ice cube vending machine. When the United States Tobacco Company sold mostly through its own stores, it sought the best corner locations in town. Their method was to station watchers with counting machines at intersections and they recorded the number of men who passed that corner. This would foretell with dependability the number of men who would enter a store at that corner and what their purchases would total.

The ice man who comes to the point of wanting this new additional business can use the experiences of many ice men who have already taken advantage of this new aid in expanding their sales volume. There is no need to guess when accurate information is available. This information should include location, display, service, advertising and distribution. And the time to start is before someone else moves in to use the newer ideas of merchandising.

Refrigerator Cars Ordered

PLANS for construction of 200 Pacific Fruit Express mechanically refrigerated "super giant" cars and 1800 standard refrigerator cars at an estimated cost of more than $26,000,000 have been announced by K. V. Plummer, vice-president and general manager of Pacific Fruit Express.

The cars are to be built at the Roseville, Los Angeles, and Colton shops of the Pacific Fruit Express Company. First cars on this order should be ready for service by December, 1956, with completion of the program July, 1957.

When you step up to a counter with the bright green "Genetron" counter mat on it, you know you've stepped up to the best refrigerants money can buy. You know you're dealing with a progressive wholesaler who looked over the field and chose "Genetron" Super-Dry Refrigerants as the brand to offer you.

No wonder! In "Genetrons," you will be getting dependable refrigerants that are:

- **Super-Dry: guaranteed exceptionally low moisture content.**
- **Non-corrosive to standard equipment materials.**
- **Non-toxic, non-flammable, stable, safe.**
- **Critical and freezing points are well outside range of operating uses.**
- **Solvent action on oil helps prevent solidification or congealing of lubricant.**
- **Miscible with oil; aid in lubrication of equipment.**

Order today—from the man with the bright green "Genetron" mat on the counter!

genetron® 12—WHITE LABEL
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genetron 141—GREEN LABEL
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genetron 11—ORANGE LABEL
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FOAMGLAS®

the cellular, stay-dry insulation

STAYS DRY—Cut a piece from your sample. Place it in water. Note how the hermetically-sealed glass cells filled with dead air keep it afloat. Weight it down for days, weeks or longer if you like. Remove the weight and it bobs back to the surface . . . proof that the sealed cells have absorbed no water, still have their original insulating efficiency.

VAPOR-PROOF — With a nail file, cut a ¼" thick slice from your sample. Hold it to your lips and try to blow smoke through it. The smoke won't penetrate . . . proof that FOAMGLAS is a positive vapor barrier in itself.

STRONG AND RIGID — Place your FOAMGLAS block on the floor. Stand on it. Note how it supports your weight without crushing. Compressive strength is over seven tons per square foot . . . making it ideal for load bearing applications.

WON'T BURN — Hold a flame to your sample. You'll see at once that it does not burn . . . an important safety feature in all construction. It's even acid-proof and rodent-proof as you can prove if you happen to have a vial of acid or a pet rat handy.

Send for a sample and make these simple tests!

Prove to yourself that FOAMGLAS is your ideal insulation!

Let us send you a free sample of FOAMGLAS. Use it to make the few simple tests illustrated. You'll prove that this unique cellular glass insulation has exactly the right combination of properties to assure you of these vital benefits: constant insulating efficiency . . . long, maintenance-free life . . . strength and rigidity for a variety of structural applications . . . ease of handling and installation.

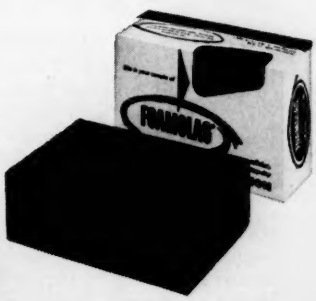
Thousands of actual users have proved in actual performance the benefits so clearly demonstrated by these tests. No wonder, then, that new users every day are picking FOAMGLAS to insulate the roofs, ceilings, walls and floors of all types of buildings, low temperature spaces, piping and equipment. Send for a sample today and make your own tests. Use the handy coupon, or write . . .

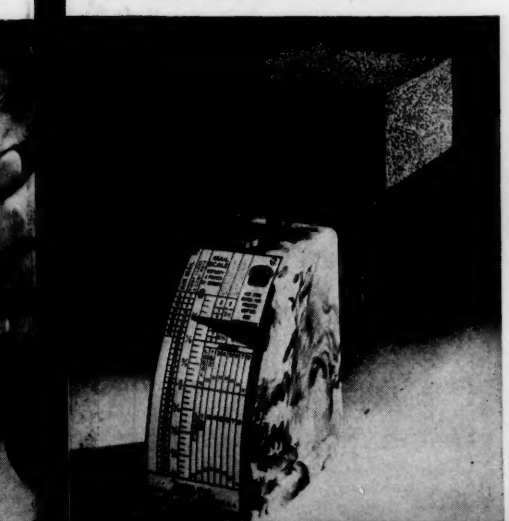
Pittsburgh Corning Corporation

Department T-26, One Gateway Center
Pittsburgh 22, Pa.
In Canada: 57 Bloor Street West, Toronto, Ontario

LIGHT WEIGHT — Just pick up your sample to see how light and easy to handle it is. Check actual weight on your company's postal scale if you wish. The density of FOAMGLAS is only 9 pounds per cubic foot.

EASY TO SHAPE AND CUT—Shave some strips off your sample with an ordinary paper clip . . . workmen use knives, saws or trowels for quick shaping and fitting on the job.





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In Canada: 57 Bloor St. W., Toronto, Ontario

Please send me a sample of FOAMGLAS for testing.

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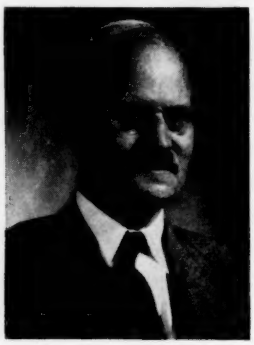
Prescott Fellowship Announced by TRRF

A GRADUATE fellowship known as the Samuel Cates Prescott Fellowship has been established by The Refrigeration Research Foundation. It carries with it a stipend of $2500 for one year which will be used to pay academic expenses, such as tuition and/or incidental expenses of a graduate student in the field of food refrigeration or food technology, with special reference to the application of refrigeration of foods. The Fellowship is established in honor of the Foundation's Chairman of the Board of Governors, Dr. Samuel Cate Prescott, Emeritus Dean of Science, Massachusetts Institute of Technology.



Dr. Samuel Cates Prescott

His previous training should include work in the fields of biology, bacteriology and the essential branches of chemistry and physics, including some knowledge of the principles of heat transfer and thermodynamics as applied in the application of refrigeration.

While it is the intention of the refrigeration Research Foundation to continue this program from year to year, beginning with the academic year 1956-57, it reserves the right to terminate support of this Fellowship on due notice.

It is assumed that during the academic fellowship year, the work required should include such courses as may ordinarily be required for the Master of Science Degree in the institution attended, and should further include some course or investigation work in the field of refrigeration of foods, or for work towards a higher degree, if the candidate already has a masters degree.

The Foundation reserves the right to withhold the Fellowship Award in any year in which an acceptable candidate cannot be selected.

In order to qualify for this Fellowship, the applicant shall be a senior undergraduate student with better than average scholastic record at an institution of recognized standing, or a graduate student with a B.Sc. or equivalent, preferably with honors, from an institution of recognized standing. In either case, the applicant should have evidence of an acceptance by the Graduate School of the Institution in which the applicant proposes to hold the fellowship. In presenting this application, the applicant should indicate his definite intention to carry through with this study and research plan for the period of time for which the Fellowship is made.

The name of the recipient of the fellowship shall be announced by the President of the Foundation at the Annual Meeting of the Foundation. Publication shall also be made in INDUSTRIAL REFRIGERATION, Food Technology, Quick Frozen Foods, Refrigerating Engineering, and Food Engineering, as soon as the recipient of the Award is announced. The Fellow may be required to furnish to the Foundation, at the discretion of the Committee on Awards, brief written interim reports, in duplicate, on the progress of his investigations, under the Fellowship Award. A final report, in the form of a detailed report, thesis or published paper in duplicate, shall be required from the Fellow.

The Fellowship is designed to give encouragement to young men and women in research in the fields of food refrigeration and refrigerated warehousing of commodities. It is also designed to point out opportunities for research or employment which exist in these spheres of work.

It is especially recommended that the applicant already have a Bachelor of Science Degree or its equivalent, and that the award be used in giving such a student help in attaining a graduate degree in the field specified.

Storage of Farm-Style Hams

FARMERS in the United States eat about two billion pounds of meat and much of it is cured by the farm-style method. That is, it is salted and smoked without pumping. To aid farmers and anyone else who may cure hams by this method, USDA has conducted studies on storage of such hams at varied temperatures. Hams cured with salt and smoke were found to keep much better at 40 F than at higher temperatures. Those stored at room temperature had deteriorated appreciably in six months.

Farmer Brown Uses Ice

FARMER BROWN, Inc., which operates in Connecticut and New York, specializes in the marketing of high quality packaged fresh vegetables. The company has run all kinds of experiments to find the best way of protecting the nutritional values and market qualities of its perishables. The following comments from the company in NAII Ice News will be of interest to all ice men.

"We have finally standardized pretty well on two sizes of ice packages which in turn are inserted in our corrugated master containers. The ice packages consists of envelopes size 11 x 18 and 9 x 11 inches which are constructed of laminated kraft paper and polyethylene sheet. Ground ice (not snow ice) in the amount of five pounds and two and one-half pounds respectively is inserted in these envelopes, which are then heat sealed and placed with the packaged commodities in master containers, the latter constructed of heavy corrugated kraft and also taped and sealed. This makes each case a fairly well insulated refrigerator unit which maintains a surprisingly good temperature for the products for eighteen to twenty hours and makes it possible for us to operate in the warmest summer weather which is the only time of course that it is necessary to use the ice pack method of packing."

New Corporation For Refrigeration of Meats

PACKERS' Development Corporation has been formed in Milwaukee, with an authorized capital stock of 50 shares of common at par value of $100 per share. Incorporation papers were signed by W. A. Gebhardt and Fred R. Wright.

The corporation was organized to promote and develop the ideas and patents pertaining to the refrigeration of meats in the packing industry. The corporation now controls all of the patents on Gebhardts' controlled refrigeration system and is now active in the process of developing ideas pertaining to the handling and recirculating of refrigerants, principally ammonia.

Fruit Farm Installs Cold Storage For Products

THE APKARIAN Fruit Company Reedley, Calif. has installed an ice refrigerated cold storage plant with a precooling capacity of 12 to 15 carloads of fresh fruit a day and a storage capacity of 42 carloads.

Practical Refrigerating Engineer
NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

In Technological Age

Practical Engineer Trains For Associate Level

KARL O. WERWATH
Milwaukee School of Engineering

MEMBERS of a dynamic engineering team have quietly and efficiently taken a yeoman's share of the responsibility for shaping of a new technological economy. In an environment of the free market, (through research and development, mass production and its twin, mass production) this team has been instrumental in providing healthful living conditions, high standards of comfort, and a new culture. All about us, in our everyday activities, we observe evidence that our ways of life are changing. In each decade of our own lifetime we have personally witnessed an ever-accelerating evolution of a technological age.

It was pioneering work to harness, on a huge scale, the forces of nature by building machines and by developing personnel to operate these efficiently. Now the technical man has a new pioneering venture — an accelerated front involving human relations. He must help in establishing methods which will adjust human beings to the use of these technological advances, to the benefit of mankind — yes, and perhaps even to prevent him from his own destruction. This is an immense task.

In this race of progress, we now perceive some voids, one of which we can do something about immediately. Technological development makes for changes in employment opportunities. Jobs are wiped out, and new and different jobs are created. (Typical of this situation today is the installation of so-called automatic refrigerating plants, which reduce in number or eliminate altogether, watch-standing operators). A swift turn of events leaves many an employed person lost and many a potential worker confused. Fear sets in — the fear of insecurity — and fear is costly.

Technology has added another fuel to this fire. Natural geographic barriers which had protected physically and economically are gone. People are thrown together forcefully. Some are frightened to the point of seeking expedient unwise "straws" for comfort and support.

Lack Qualified Technicians

Concurrently there exists, here in the United States, and, in fact, in most of the countries of the world, a lack of persons to do certain technical work. A growing number of key and critical jobs are unfilled because there are too few people who are really qualified to perform them.

Karl O. Werwath

Those who have so sedulously helped to fashion our society through technological development, are destined to take a leading role in the solutions of the problems confronting us. In the front line, we now find the engineer, the engineering educator and the industrialist working together. Concrete plans and forward actions are in the making. One of these is the renewed emphasis on the development of the Technical Institute Type of Curriculum.

The very nature of this type of Engineering Education, with its flexibility and spread, has deterred public understanding of the place which it has in our educational system. There are other factors which have contributed to its relatively slow growth as compared with the need. But now the acute situation at hand provides opportunity for a fast advance. Fortunately, there is a well established pattern of a small but excellent sampling of what can be accomplished.

Levels of Engineering Work

In order to think definitely about skills developed in Technical Institute Type Curricula, it is necessary to establish boundaries. We require a concept of the relationships of the three levels of occupations in engineering work. The occupational assignments which make up the engineering team consist of three related, yet distinctive, groupings:

Karl O. Werwath, president of Milwaukee School of Engineering, has had a lifelong affiliation with the engineering profession. He is the son of the late Oscar Werwath, founder of the school and president until his death in 1948. His paper published here was the major address at the Milwaukee Chapter, NAPRE, Charter presentation, March 24, 1955.

Karl Werwath was graduated from Milwaukee School of Engineering with an electrical engineering major in 1936. He did further study at Northwestern University and at the University of Wisconsin, returning to MSOE in 1938 as assistant registrar. He was then successively instructor, registrar and vice president before succeeding his father as president in 1948.

He is currently vice president of the Milwaukee section of the Wisconsin Society of Professional Engineers and serves as chairman of the Technical Institute Division of American Society for Engineering Education. He is a past president of the National Council of Technical Schools, a director of the Milwaukee Rotary Club and is president of the Milwaukee Executives Club. He is also president of the new Technical Institute Foundation.

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Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., and educational association, "not-for-profit".

(1) The service — vocational level.
(2) The technician — engineering associate level.
(3) The engineering — professional level.

The service man can be likened to the artisan in background, technical knowledge and general education. He possesses manual skills as a major strength and requirement of his occupation, and although there are elements of technological and psychological aspects to his work, these are of lesser significance with a minimum requirement of being able to get along with his fellow workers.

The engineering technician[1,2] combines *technical and practical know-how* in one of a combination of technical specialties, with commercial judgment. His work is characterized by the ability to rationalize a problem by using tools of thought. He requires a working knowledge of mathematics and basic science in addition to a superior knowledge of the practices in his technical specialty. To absorb information and to think clearly, he needs a good working knowledge of his mother tongue, since he works extensively as a production group leader and in industrial situations he must acquire a working "feel" of the factors involved in human relationships.

The engineer has the characteristic requirements of the highest type of professional man. The unfortunate broad dictionary definition is being compensated for by strong and splendid efforts of the profession itself through establishment of high standards, codes and licensing procedures. These are bringing a fine understanding of the professional engineer and his work to the public.

Surveys Technical Graduates

The Milwaukee School of Engineering has been offering courses in refrigeration since 1926. During the last five years it has, in a special project, kept track of the first jobs of the graduates of this 18-month technical institute type course which now leads to an Associate Degree. Three hundred seventy men received such certificates in the five-year period from 1948 to 1953. Of these 370 men, 335 were employed by 249 different firms through the national with job titles such as these:

Design Technician
Engineer's Assistant
Draftsman
Field Service Representative
General Manager
Installation Supervisor
Laboratory Technician
Layout & Estimating Technician
Owner of Business
Plant Superintendent
Production Superintendent
Sales Estimator
Sales Representative
Inspector
Service Manager
Service Specialist

Through Milwaukee School of Engineer's Industrial Advisory Committee and as a special thesis project, this group wrote many of these employers and also the graduates employed, asking them to identify the levels of knowledge required in certain specific areas. There are 16 areas which we considered in an attempt to make a job analysis of a typical technician occupation in the field of refrigeration and air conditioning. Seven of these could be classified as technological in character, seven as psychological, and two as physical and manual characteristics. The committee then asked both the employer and the student to give the level of information required of these 16 individual characteristics for the successful execution of the job as a technician. Here is what was learned:

Sixteen Basic Skills

All three of these employment levels require a combination of a different basic set of interests, abilities, aptitudes, and educational preparation. We are interested then in determining the combination of skills of the engineering technician occupations. The Engineers' Society of Milwaukee, Committee on Professional Development, has been engaged for three years in a program of aptitude testing and job specification called The Milwaukee Plan[3,4]. This group has classified the requirements of the technical jobs of three broad categories into sixteen factors:

Preponderantly Technical:

(1) Scientific and engineering knowledge
(2) Mathematics
(3) Plans, drawings, diagrams and codes
(4) Research
(5) Organization of Technical Work
(6) Clarity of expression in speech
(7) Clarity of expression in writing

Preponderantly Psychological:

(8) Self-reliance and drive
(9) Social intelligence and tact
(10) Emotional stability
(11) Dependability in scientific and engineering work
(12) Leadership in work direction
(13) Sales ability and interest
(14) Professional aims and development

Physical and Manual:

(15) Appearance and bearing
(16) Manual abilities and skills

Over Half of Modern Skills Found Technical in Nature

The Milwaukee School of Engineering, in analyzing jobs of graduates, found these three general classifications of Engineering Society of Milwaukee useful to help set up broad percentages in these various sets of skills which comprise the total required of a particular job. Statistics are now available for first jobs of 125 engineering technicians. They have been obtained by writing first employers one year after a graduate has been employed, asking for the breakdown of his job. The ratings were made by the direct supervisor.

For these jobs engaged in by technicians, it was found that 55 percent of the total skills, on an average, are classified as technological in character, 19 percent as psychological, and 26 percent manual. Therefore, in a most general way, one-half of the skills of the technician on his first job are considered by the employer to be technological, one-quarter psychological and one-quarter manual.

As these technicians progress, the psychological factor becomes increasingly important. A recent study on engineering personnel in a major industry, points out that the psychological skills become twice as important as the technological skills on the basis of actual remuneration and advancement in the higher pay brackets.

Technician Job Evaluations

In a study based on the Milwaukee Plan, called Job Evaluation[5], in which the first jobs of this same group of technicians were analyzed using a job specification analysis, four specific technical jobs were analyzed to provide composite values of the sixteen basic skills. Table 1 shows the composite requirement for each occupation (a minimum scored by the majority of the companies rating the job). The four specific jobs were: No.

[1]Engineers' Council for Professional Development, Nineteenth Annual Report, pp. 40-44.
[2]Code of Minimum Standards, National Council of Technical Schools, 1944.
[3]"Milwaukee Plan of Aptitude Testing," Mechanical Engineering, September, 1948, pp. 750-1.
[4]"Matching the Man and the Job" Product Engineering, May, 1952.
[5]E. Spaay and N. Cooke, "Job Evaluation" Milwaukee School of Engineering Thesis #489 (unpublished), October, 1951.

1, Erection Engineer; No. 2, Service Technician; No. 3, Sales Representative, and No. 4, Laboratory Technician.

Individual Economic Traits

To these basic personal characteristics must be added the ingredients of a dynamic belief and full understanding of the individual's part as a single entrepreneur within the free enterprise system. A discussion of skills would be incomplete without reference to the functions which an individual should develop to become a successful producer in the American Pattern. As an individual he is in fact an entrepreneur, and has the same function in his way as any size business enterprise also possesses.

Here is a summary of the nine economic functions of the enterpriser:

(1) The function of *Record Maintenance.* As others, it is not demanded by any written law, but assuredly he, whether he be an individual or enterprise of thousands of workers, will find rough going without records on which to build statistics for controls and forecasts and for proving points to the banker, the prospective employee, the tax gatherer, the stockholder, or the buyer. Certainly no modern operation, individual or group can function in any degree of success with attention to the function of record maintenance. This is taught the individual student. There are no ways to do this educating in a total technical institute curriculum. However, for the individual outside the school, educational associations of the industry must do the job.

(2) The function of *Product Design.* The service rendered or the product manufactured must be continually redesigned to tell the buyer what he wants to hear — to truly benefit in this dynamic age. Technical institutes courses are an intergral part of a changing technology to supply changing types of personnel with each new development. The product design of the individual is service rendered. It must be redesigned to keep the individual in pace with the times.

(3) The function of *Buying.* Certainly the individual must know how to acquire, what to acquire, and from whom to acquire to be a successful operator.

(4) The function of *Production* — his own production, its quality, its speed. Production is an element in everybody's makeup. The individual must have a concept of this element of producing services or goods.

(5) The function of *Sales.* All agree that everyone is selling every moment of his experience. Where there is no selling, there can be no production. This is an integral part of an individual's existence. How many engineers and technicians are failures because they don't understand the selling function! Certainly this is a part of the young man's makeup in a dynamic America.

(6) The function of *Industrial Relations*—so called in American Industry for want of a better term. It is the relations with your intimates, with members of your family unit, close competitors, and close friends. Occasionally, in a larger organization, the functional direction is invested in the personnel department through its several personal services. People as well as enterprises have the problem of relations with their fellow workers. This is a function which must be taught for positive results.

(7) The function of *Public Relations.* Certainly this element has been mighty limp with respect to technical institute type of curriculum during the past quarter of a century since the term "technical institute" was coined. NAPRE can

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do much for its members also, in arranging programs on this topic, too.

(8) The function of *Finance*—extremely important to public and private institutions alike, it is as important to the individual and just as difficult to handle.

(9) The function of *Personality* of the individual, the personality of the school, the personality of the business enterprise. For all these do have personalities and characteristics just as individuals. This is an element in the total enterpreneur whether it be the individual or a group engaged in a common purpose.

One way to understand these functions and to put them into play toward the development of the individual is for a technical institute administration developing technical in-

TABLE 1—CHART SHOWING ANALYSIS OF A JOB EVALUATION STUDY OF 16 BASIC SKILLS REQUIRED IN THE FIRST JOBS AFTER GRADUATION, FOR FOUR SPECIFIC (ENGINEERING) TECHNICAL OCCUPATIONS, BASED ON THE MILWAUKEE PLAN.

Basic Skills Involved	Trait or Characteristics which the Job Requires	Position of Job Nos. No. 1	No. 2	No. 3	No. 4
	Preponderantly Technical				
1. Scientific & Engineering Knowledge	Carrying through complex analyses in one specific field			●	
	Carrying through simple analyses in one specific field independently	●	●		●
2. Mathematics	Applying college algebra, analytical geometry, trigonometry and logarithms	●		●	
	Applying high school algebra, geometry, trigonometry and logarithms				●
	Using arithmetic, percentages, fractions, etc.		●		
3. Plans, Drawings, Diagrams and Codes	Preparing a variety of simple plans, diagrams or codes	●		●	
	Interpreting simple plans, diagrams or codes for others for action		●		
	Understanding simple plans, diagrams or codes				●
4. Research	Associating new ideas and developments with new technical problems	○	●		●
	Using only past experience in meeting new technical problems			●	
5. Organization of Technical Work	Work for numerous unrelated individuals			○	
	Work for a small single group of individuals			○	
	Varied technical work for own execution		●		●
6. Clarity of Expression in Speech	Presenting complex ideas clearly and conclusively in reports or conference	●		●	
	Speaking extemperaneously and convincingly about simple ideas and things in everyday contacts with customers, associates, etc.		●		
	Conveying instructions clearly to others				●
7. Clarity in Expression in Writing	Comprehensive reports with sound conclusions for basis of action			●	
	Technical correspondence with sales representatives, customers, etc.	●			
	Informal memoranda and routine reports		●		●
	Preponderantly Psychological				
8. Self-reliance and Drive	Initiating and carrying through unrelated complex projects	●		●	
	Following through single complex projects		●		●
9. Social Intelligence and Tact	Ability to maintain good personality relationship in everyday job relations	●	●	●	
	Recognizing social relationships and problems between oneself and other individuals				●
10. Emotional Stability	Great stability in coping with emotional stress involved in unusual pressure of work	●		●	
	Stability with under more than usual pressure to expedite work		●		●
11. Dependability in Scientific and Engineering Work	Complex analyses and calculations in relatively familiar field	●		●	
	Simple analyses and results		●		●
12. Leadership in Work Direction	Inspiring leadership and co-ordination of simple activities which is effective through one subordinate level of supervision	●			
	Direct leadership for small groups			●	
	Leadership on occasions only when requested		●		●
13. Sales Ability and Interest	Selling small groups of people with varied interests about new ideas and things	●		●	
	Convincing individuals about ideas				●
	Interesting individuals in things		●		
14. Professional Aims and Developments	Improving self culturally, in some subject, through a definite program	●		○	
	Developing self technically for present or next job		●		●
	Preponderantly Physical or Manual				
15. Appearance and Bearing	Appearing confident and poised in difficult situations			●	
	Ready acceptance by strangers for appearance and bearing	●	●		
	Acceptance by associates in respect to appearance and bearing				●
16. Manual Abilities and Skills	Good manual skill with fine tools and equipment with good sense of proportion		●		
	Good manual skill with a variety of simple tools and equipment	●			●
	Fair skill with simple tools and equipment			●	

Job No. 1. Erection Engineer; No. 2. Service Technician; No. 3. Sales Representative; No. 4. Laboratory Technician.

stitute type curricula to work closely with industry. *That same analogy can be applied to NAPRE. Industry and the Association should not be strangers.* These "M's" of money, materials and men are another whole factor worthy of detailed analysis. It is hoped that Milwaukee School of Engineering will become a part of your deliberations as the work of the Milwaukee chapter progresses.

NAPRE members are to be congratulated, individually and as a group, for selecting the field of refrigeration for life careers. By penetrating almost every major field of endeavor, such as food preservation and distribution, comfort cooling in domestic, commercial and industrial applications, technical processing, metal fabrication and most every other modern economic venture, with their machinery and application know-how, members are creating new markets and are doing it so fast that the refrigeration industry is becoming a major factor in our world-wide system of production and trade. Further, members are to be congratulated also because they are taking the step of applying their talents to professional development of themselves and their fellow-practitioner. This is, indeed, an integral requirement of a technical field such as refrigeration and air conditioning.

NAPRE Contributions

We need not dwell at too great a length on the applications you are making of refrigeration. In the domestic housing market, for instance, of the better than one million starts in 1955, over 20 percent of the homes have installed custom cooling as a part of the original equipment. This vast market of over 250,000 units is in itself a phenomenal industry, but added to the conditioning of air for stores, offices and professional establishments, schools, hospitals, buses, trains, aircraft and trucks, it all adds up to an enormous new dollar market. NAPRE members are meeting needs primarily in operating large equipment for institutions, public buildings, produce processes and warehouses, and certainly in their daily work members are seeing vast technological changes both as to the number of men needed and the knowledge required for successful execution of job assignments.

Again, congratulations on NAPRE's dual achievements, that of being in a very wonderful field in the service to mankind and that of undertaking a professional approach toward furthering this chosen field.

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Model Vacuum Cooling Plant For Lettuce Demonstrated at San Francisco

BOB McKEE
Mechanical Engineer
Pacific Fruit Express Co.

DISCUSSION at the December 12 meeting of California Chapter No. 1, San Francisco, on the "Gay-Vac" system was a most interesting session and quite informative for all. A working model, about the size of an ordinary desk and on casters to permit its easy moving about, was used to demonstrate the vacuum cooling principles. The presentation included colored slides showing the manner in which lettuce is field packed in cardboard cartons and handled through the vacuum coolers, using the same slides presented by Frank Hibbs, Jr., at NAPRE's Los Angeles Convention, November 1955. In fact Hibbs was present and was asked questions as the slides were shown.

Cooler Demonstrated

At the conclusion of the slides, the model vacuum cooler was put through a cycle with a head of lettuce, a pan of water and a pan of tomato juice in the chamber. Through the glass view-plates, the water and tomato juice could be seen to bubble, then boil violently and finally to freeze solid, while all the time a dial type thermometer with sensing bulb in the chamber showed the same room temperature as before the cycle started. This very dramatically showed that the cooling was coming from the absorption of heat from the material by the boiling of moisture on the surface of the material itself, and not by blowing cool air through the chamber as in the usual cooling methods.

The model uses ice as a source of refrigeration to condense the water vapor formed during the process, with a small vacuum pump to draw the initial vacuum. In this regard it should be pointed out that in the vacuum cooling system, the vacuum pump is merely a purge device to remove the initial volume of air and other non-condensibles, and the main process depends upon the removal of water vapor formed by condensation on a refrigerated surface. In past seasons, the use of ice as a condensing medium has brought the vacuum cooling plant within reach of small cooling operators throughout California and Arizona.

Most interesting aspect of the meeting was that with all the publicity and articles about vacuum cooling, there were a lot of engineers who didn't understand the apparatus until they saw the working model. As a result, many of them not only were able to see how the process works but thought of how it may be applied to their own business and it seems that it may have even wider application throughout the industry—another service of the NAPRE. (Pictures are courtesy of Henry Guilmette, 1956 president of California Chapter No. 1).

Prefreezing Wax Dip For Preserving Meat

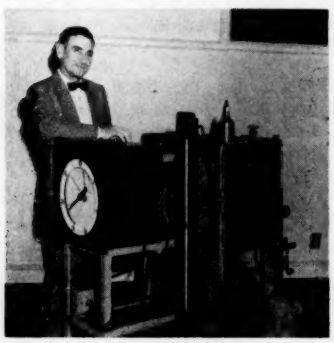
IN THE first commercial test of its kind, processors are trying to improve the "freezability" of meat and poultry by predipping cuts in wax, an oil product. Food experts say that the wax coating seals in juices, thereby preventing the meat from drying out during the freezing process. When the coating is removed days or months later, the meat is still red and juicy. Wax will be no problem to the housewife, since it can be peeled off easily without sticking to the meat. This wax is an oil based microcrystalline variety specially modified for food processing.

City Products Buys Plant

THE City Products Corp., which owns controlling interest in Crystal Ice & Cold Storage Co., Phoenix, has purchased the Charles E. Goetz vacuum and ice cooling plant at Tolleson, Ariz. The Goetz ice plant has a 200-ton-per-day capacity and storage space for 12,000 tons.

Fire Damages Food Warehouse

FIRE badly damaged the four-story MacDonald's Consolidated Food warehouse in the industrial section of Victoria, B.C. All available equipment from the city fire department fought the blaze. The entire building was almost a complete loss. The plant was adjoined by a frozen foods plant.



Left: Frank J. Hibbs, Jr., poses with the Gay-Vac model of Gay Engineering Company's vacuum cooling apparatus, just prior to the demonstration at San Francisco NAPRE meeting in December 1955. Center: Speakers Row at San Francisco meeting (l. to r.): R. F. McKee, Mech. Engr., Pacific Fruit Express, Speaker; H. E. Boudreau, Refrig. Div., Cyclops Iron Works, Chapter Jr. Past President; F. J. Hibbs, Jr., Gay Engineering Co.; and Leroy Etzel, Natl. President, NAPRE, Gen. Supt. of Refrigeration, Pacific Fruit Express. Right: Members at San Francisco gather-round for informal review of vacuum cooling principles. Back to camera: L. I. Denton and H. E. Boudreau. L. to R., Chas. Obenauer, Haslett Cold Storage Warehouse; M. T. J. Garlinger, USMSTS — Pacific; Ted Lysten, Minneapolis-Honeywell Co.; R. F. McKee; John H. Herzog, San Francisco Brewing Co.; F. J. Moser, Sunshine Biscuit Co.; and F. J. Hibbs, Jr.

From the President's Desk

New Chapter Goals and Industrial Membership Program Receive Top Priority

Frank L. Chase

AT THE beginning of every president's administration he looks forward to the objectives he wishes to see come into being during his tenure of office. Real-life tools for implementing these objectives are the national committeemen. Our committees are appointed, and are taking over their tasks with much enthusiasm.

Professor Harold P. Hayes, Chairman of our Educational Committee, and Guy R. King, Vice-chairman, both have their programs well in hand. Members will read about their work from time to time in this publication. Their activities will be coordinated this year together with that of another Assistant Chairman, and by Regis Gubser, junior Past President and newly designated Educational Director. Elmer A. Johnson, one of the wheel horses in the Los Angeles Chapter, is the new Educational Assistant Chairman with the Certificates of Proficiency as his major responsibilities.

The Membership Committee is under the guidance of George L. Paulick who has served the Los Angeles Chapter in many capacities. His coworkers, as in the case of all our national committees, are located in all parts of the nation. To some of you, George is new in the National picture. Your convention delegates, nominating committee and officers are convinced of his ability to sell the NAPRE to the men producing refrigeration in its many phases, resulting in benefits to them as individuals and indirectly to their firms or employers.

Chase Builds New Chapters

Information reaching this office indicates new chapters are soon to be formed and others revived. Members-at-Large are the principal developers of new chapters. Frank L. Chase, our second Vice-president, is the officer most responsible for promoting this activity with the membership not affiliated with chapters. He already has strong potential in active groups working in Houston, Texas, District of Columbia, Jackson, Miss., Birmingham and Mobile, Alabama, and Metropolitan New York.

Reactivating chapters which have slipped up lately or gone out of active status in post-war years is first Vice-President Bert C. McKenna's assignment. Twin Cities (Minneapolis and St. Paul), Omaha, Nebr., Council Bluffs, Iowa, Portland, Ore., and Indianapolis, will receive his immediate attention. Other chapters will be assigned as the year goes on. All officers and directors are urged to assist the Vice-president in every way possible with their tasks.

Committee Changes Name

More consistent with the work it is accomplishing, the Publicity and Public Relations Committee will hereafter be known as the Industry Relations Committee. Although publicity for the Association will continue to be one of this committee's assignments, at the national level this particular task reaches its peak with our annual meetings. The national committee will also continue to encourage and instruct chapters to obtain local publicity.

However, during this term the committee will concentrate its energy on industry; NAPRE's relationships with the varied phases of the refrigeration industry. "Let's Quit Being Strangers" will be their slogan, as they set about to show these allied firms why they should be interested in NAPRE and what benefits may be derived from their interest. The Industry Relations department is under the direction of S. Averell Cole of Michigan City, Indiana. NAPRE has benefited from his efforts in the past and I know he will continue with this new title for his program.

NAPRE's National Finance Committee is under the supervision of E. T. Quinn, with eight top-notch helpers. From the results of their efforts in 1955, we are hopeful of augmenting and better regulating our Educational fund which is a necessity for the Educational Committee to carry out their plans. The Finance group, Industry Relations, and Memorial Committees will coordinate their activities closely with the work of the national office in promoting the Association's new Industrial Membership. Members will recall that Gubser, our junior Past President is also chairman of the H. G. Venemann Memorial Educational Fund.

Past President Erich B. Utescher again heads up the Publications Committee. Aside from the monthly gathering of articles for NAPRE's "official" section in IR, the most important assignment to this group is publication of the 1956 Operating Data Book, in its 16th edition. This Annual will be ready for distribution late this month.

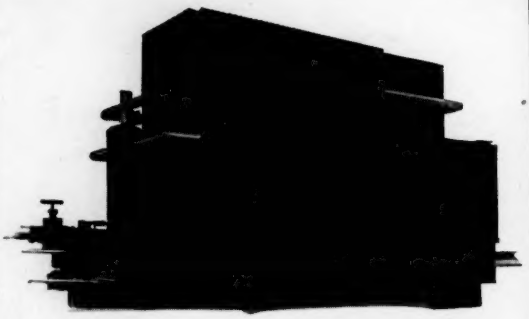
Chapter Report of the Month

During the term of my predecessor, he inaugurated a custom of citing one chapter report per month. The object of these reports published in IR is to acquaint all chapters with worthwhile acts of others. Also to give other chapters the benefit of the important or salient points from papers or talks before the reporting chapter. It appears to be an excellent way of encouraging more reports. This month it is a pleasure to recommend the report of Vernon Kummel, Texas Coastal Bend.

NAPRE Bows To United Fund

Plans of NAPRE's Board of Directors to accept Detroit's invitation to hold the 47th Convention on November 5 through 9, have been changed. It was learned a few weeks after reserving these dates that the United Fund of Detroit has selected the same dates as the wind-up to their annual campaign. Apparently in Michigan the group concludes their drive with dinners, proceeds from which also go to the fund. These banquets were to have been held the same night that NAPRE had reserved for its annual banquet. Hotel facilities in Detroit are such that both could not be accommodated simultaneously in the hotel which NAPRE had selected. Therefore our association has condescended to move our convention dates ahead to October 29 through November 2. The change of dates will also avoid conflict with other organizations.

L. Etzel



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Natural Ice Harvest Continues As Big Business in Maine

THE ice cutting business is still big business in some parts of the country. At Presque Isle, Maine various types of artificial refrigeration have failed to dampen the natural ice harvest, where around 12,000 tons of ice is cut every winter on Presque Isle Stream. Joseph Gagnon owns and supervises the business, an operation which started in 1946, shortly after he got out of the Air Corps following World War Two in which he served as a civilian safety engineer.

Of the 12,000 tons of ice cut yearly, from 8,000 to 9,000 tons goes to the Bangor and Aroostock railroad which uses the ice to preserve perishable foods shipped by rail. The rest is used by Gagnon himself for his commercial ice business. Seventy-five to 85 men work annually during the ice harvest, some of whom work round the clock to keep equipment in tip-top condition. The harvesting period lasts from 21 to 30 days.

Gagnon has been using an 18 hp Wisconsin power saw to cut ice from Presque Isle stream and he said that because of the thickness of the ice this year, he is having great difficulty in cutting through. "This is the thickest I've ever seen the ice since I started in this business," Gagnon said. "It measured 26 inches and this probably can partly be attributed to a cold December, one of the coldest on record."

Gagnon, who operates one of the largest, if not the largest ice harvesting business in the state, has his own welding shop and garage which is used to keep equipment in condition at all times. In addition he annually hires experienced ice packers from Laconia, N.H., to show local workers how to pack the ice. He also hires men, who continually file saws, keeping the blades keen as a razor.

When the operation is first started in December, men start cutting the ice directly in front of Gagnon's ice plant located on the banks of the stream. As the ice is cut the operation moves upstream and down stream and more often than not a part of the crew will work over night in order to have the load chutes ready for a new location after the huge blocks of ice, weighing around 400 pounds each, have been cut from one area.

The ice is carried on a conveyor type rack after it has been cut and hauled out of the water. The blocks of ice move on the conveyor up over a high embankment, which borders the stream, onto waiting trucks on which they are taken to be packed in box cars for shipment to Caribou. On arrival at Caribou the ice is packed with sawdust in storage plants. Later the ice is used to preserve foods shipped by the Bangor and Aroostook railroad to points south.

The ice also moves on the conveyor straight to Gagnon's ice house where it is packed with sawdust for commercial use. Gagnon has been harvesting now for a period of 10 years and as he puts it, "I'm looking forward to many, many more years of this type of ice operation."

Enthalpy of Foods

PROGRESS has been made on the TRRF study of changes in enthalpy (heat content) of foods as they freeze and thaw at the University of Illinois. A new approach has been used, involving special equipment, basically a Dewar flask calibrated for these studies. From an energy standpoint, freezing and thawing yielded essentially the same results. The enthalphies measured were not significantly different from those calculated from published data.—TRRF Information Bulletin.

More Bakers May Make Frozen Bread

THE U. S. Department of Agriculture reports that more bakers are looking hopefully towards the commercial freezing of bread, a practice that promises to reduce staling, loss of unsold loaves and costly night baking. They also hope that frozen bread sale might help to reverse the downward trend in wheat consumption. In 1900, the per capita consumption of flour was 225 pounds, while in 1954 it was only 124 pounds.

USDA experts have been probing into the technical side of bread freezing, to find out what it does and does not do to bread. They learned that the maximum storage temperature for top quality bread is 10 F for periods of about a week, while 0 F is needed for extended storage.

Bread is best when frozen as rapidly as possible as soon as it leaves the oven, the USDA, said. Quick defrosting is also preferable, although freezing time affects crumb firmness more than defrosting time does. Frozen bread stored for more than a day should be wrapped in sturdy moisture-vapor-resistant material that is flexible at low temperature, and it should always be stored separate from strongly flavored foods. Moisture distribution in frozen bread is essentially the same as in freshly baked bread, the USDA found, and will remain that way for four to seven weeks at 0 F.

Cottage Cheese — Marketing And Storage Problems

COTTAGE Cheese is a short-shelf-life product, but its problems as revealed in a recent Michigan State University study, closely parallel those of some other perishable foods. The study was essentially a market survey.

In carefully managed storage tests, shelf life was found to be twice as long at 42 F as at 50 F. Only 8 degrees of difference mean a lot to cottage cheese. Shelf life of samples picked up from stores and plants varied from five to 23 days, suggesting that with care in manufacture and storage, good quality can be held for as long as three weeks.

Among retail cabinets surveyed, variation of as much as 14 F was found between upper and lower display levels. Surface slime was the most common type of deterioration which can be caused by any of various microorganisms. Off-flavors were also common cause of limited keeping quality.—TRRF Information Bulletin.

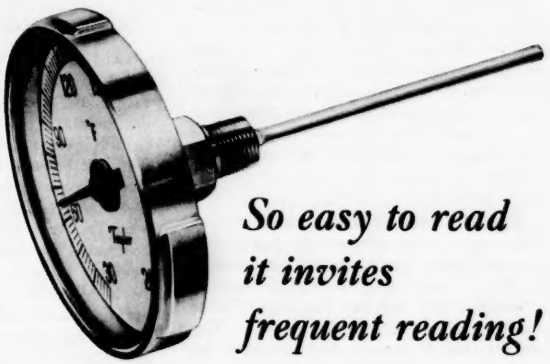
Standards For Chilled Orange Juice

THE United States Department of Agriculture has announced a proposal for standards for chilled orange juice. This kind of orange juice is usually packaged for the consumer trade in wax-paper cartons, similar to those for milk.

The proposal would cover two principal types; fresh or processed. In the processed types, the juice is heat treated, or otherwise treated to prolong the keeping quality when held at proper temperatures to keep the product chilled while being marketed. In the fresh type no sweeteners are permitted. The proposals would provide that the processed types may be prepared as an unsweetened style or a sweetened syle. The grades proposed include Grade A (or fancy) and Grade B (or choice).

The proposal covers technical requirements for ascertaining quality factors with respect to coagulation, separation, color, defects, and flavor. In both grades A and B, an appearance of fresh orange juice is required.

NEW TAYLOR BI-THERM* DIAL THERMOMETER



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ACCURATE: These instruments are accurate within ±1% of range, over the entire range. Simple zero-setting features correct minor errors in readings which might result from severe mechanical shock. No ambient temperature effect. Overrange protection 50% up to 500° F.; 10% above 500°F.

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News Notes and Chapter Activities

Texas Coastal Bend

VERNON KUMMEL

GREASES and their use was discussed at the meeting of December 2 which was called to order by Dan Miller, Vice-president. This interesting program was put on by Al Hartin, Ken Karger and Tom Harvard of Sinclair Oil & Refining Company. To start with, a definition of grease was given — Grease is a metal soap which holds lubricating oil in place to do the proper job of lubricating.

Three different base greases were used in the demonstrations; calcium, sodium and lithium. Of these three, the lithium based grease is a multi-purpose grease, due to its superiority in resisting heat, not thickening too much when cold and its retention of about the same consistency after working.

The first demonstration was ability of the grease to be pumped by hand in a regular grease gun with the temperature at 5°F. Tubing went through a bath of ethylene glycol and dry ice. The calcium based grease was the first to stop. The sodium based grease was the next to stop flowing at 5°F and the lithium base grease continued to flow.

The next test was made with a lump of each type of grease dropped into a beaker of boiling water. The sodum based grease started to disintegrate almost immediately. The calcium based grease lost a little of the amount, while the lithium based grease was impervious to the boiling water.

The next demonstration was made under infared heat lamps. At 190F the calcium based grease was melting, the sodium grease started melting at 350F, and the lithium started melting at 390F. The oil ran out of the calcium and sodium grease leaving the soap. The lithium based grease melted but ran together and when cooled was still a grease. The first two had disintegrated while the lithium based grease had only thinned out to the point where it would run.

The last test was a drop test made with a steel ball into a cup of fresh grease. The comparison was made with grease which had been worked. The ball dropped onto the cup of sodium grease and remained on top of the surface. The drop into the grease which had been worked showed a slight indentation.

In the drop into the calcium grease there was a big difference in the penetration of the ball in the cup of grease which had been worked. The drop into new and worked lithium based grease was practically the same. In conclusion Mr. Al Hartin said, "The proper grease for the job is the secret of correct lubrication. The wrong grease can do more damage than good". Our chapter members plied the speakers with questions on uses of grease around their plants.

At this meeting the nominating committee presented recommendations for officers for the coming year. The following named officers were elected unanimously to the 1956 term: President, Dan Miller, Hugh Drane Co.; Vice-president, Vernon Kummel, Southern Texas Ice & Service; Secretary-Treasurer, Dan Chapman, Southern Texas Ice & Service; Sgt.-at-Arms, Charles Whitoff, Victoria Frozen Foods Co. The directors appointed are Charles Pfeiffer, Central Power & Light Co.; Frank Barton, Port Ice Co., and Herbert Snyder, Southern Texas Ice & Service.

Colton

HARRY BONTER

CALIFORNIA Chapter No. 5 met on Wednesday, December 14, at the Santa Fe Ice Plant lunchroom, San Bernardino. After the roll call, president Carl Hooker proceeded with the nomination and election of officers for the next year as are listed below. As usual the secretary was railroaded in for another year. He can't seem to get side tracked. To make the secretary feel happy the members voted to give him an honorarium for his services to the chapter. (Thanks).

The members also voted to pay C. H. Purkiss his expenses as a delegate to the convention. The meeting was then turned over to Purkiss for a report on the activities at the convention which was a very detailed report along with colored slide pictures of the various speakers, exhibits and other functions that made the convention a pleasure and a success. We thanked Purkiss for his complete and entertaining report.

New officers are: President, A. W. Franklin, Gold Buckle Orange Assn.; 1st Vice-president, J. E. Machut, Pacific Fruit Express; 2nd Vice-president, J. E. Finfrock; Secretary-Treasurer, H. O. Bonter, (retired) formerly Pacific Fruit Express and Sgt.-at-Arms, Roy Aschom, Pacific Fruit Express. The following committee chairmen were appointed: Educational instructor, F. J. Scherer, National Ice & Cold Storage; Program Chairman, C. H. Purkiss, Pacific Fruit Express; Membership Committee Chairman, J. H. Mairs, Pacific Fruit Express; The directors are C. L. Hooker, Exchange Orange Products; T. C. Bangs, Golden State Co., Division of Foremost, and Alvie Miller, Santa Fe Ice & Precooling Plant.

Memphis

CHAS. CONLEY

DECEMBER meetings of Tennessee Chapter No. 1, were devoted to lectures by H. L. Todd on Chapter 3 of Basic Refrigeration, our official text. This chapter deals with refrigerants. Todd brought with him several containers with various refrigerants in them. By various devices he showed reaction of the refrigerant under different temperatures and conditions. "Chalk-Talks" were used to put over his remarks.

Officers for the 1956 term were elected at our December 7 meeting. They are: President, John H. Robinson, chief engineer, West Tennessee T. B. Hospital; Vice-president, Claude F. Pace, assistant engineer, Swift Ice Cream Company; Secretary-Treasurer, Chas. A. Conley, chief engineer, Memphis Cold Storage Warehouse Co., and Mid-South Refrigeration Warehouse Co. The following committee chairmen were appointed: Educational committee, Alvis J. Clay, asst. chief engineer, Mid-South Refrigeration Warehouse Co.; Membership Committee, James W. Sarnes, chief refrigeration engineer, University of Tennessee and Everett Wilburn, turbine operator, Tennessee Valley Authority; and Chapter Instructor, H. L. Todd, owner, Coffee Dispenserinshops.

The chapter meets on the first and third Wednesday of each month at 8:00 pm. in the Hotel Chisca. Members visiting Memphis are cordially invited.

Tacoma

PHIL GILMORE

ATTENDANCE has picked up markedly since the chapter purchased a 16 MM sound motion picture projector. We can now tap the abundance of industrial and educational films that are available to us for just the postage. We are getting under way now with our educational and other programs. The unexpected demise of our long time secretary and well-liked friend, Elmer Johnson, left quite a bit of turmoil and confusion. We didn't realize how much we leaned on Elmer to get things done until he wasn't here to do them.

Gene Rytlewski gave a summary of the background of our honored member for the evening. The honored member was none other than our 1954-1955 chapter past president, Art Clementson. The expression on Art's face when Gene introduced him indicated it came as quite a surprise to him. He was presented with a Seth-Thomas clock. Art gave a very nice appreciation speech, at which time he was given a standing ovation by the members.

Guest speaker for the evening was William R. Wallin, Dole Valve Company, Plumbing and Heating Division, on the topic of "Flow Control Valves". He explained that some of the water shortages in the suburbs is due to the waste of water. He gave this example: when someone washes or maybe shaves they turn the water way up and leave it run. In doing this there is approximately 4 to 5 gallons per minute being used. When a flow control valve is installed, no matter how far the water tap is opened you can control the flow as specified for the control unit installed. Common practice for this purpose is to reduce the flow to 1½ to 2 gallons per minute. Mr. Wallin explained some of the new valves that his company is marketing for the refrigeration and air conditioning field.

During the discussion, several members recalled an article by National Past President, Erich B. Utescher, which was accompanied by several charts on water wastage. The charts indicated the amount of water wasted in a 24-hour period by a leaking valve, whether it be a drip or a steady stream. The leakage was averaged in dollar and cents of operating expense. (The charts appeared in IR, Page 34, May 1954).

Vice-President Gene Kelly Cited

Members also learned in December that chapter Vice-president Gene Kelly had been cited by the Postoffice Department for a practical suggestion he made at his plant, the main Postoffice here in Chicago. Gene was presented with a $100 check and a certificate describing the achievement just a few days before Christmas by Chicago's Postmaster. The award came about as a result of Gene's contribution to the Government Suggestion Box Program which encourages employees to contribute ideas for promoting efficiency and saving waste.

In this instance, Kelly's contribution was not in the line of refrigeration. It had to do with an incinerator. The suggestion not only saves 8 hours out of every 24 in operating time, but it promotes safety as well as efficiency. Employees have been in the habit of running a gurney of waste materials up a ramp onto a platform where it was dumped and hand fed to the incinerator. Using no other materials than steel scrap available on the premises, nor the investment of any additional government funds, Kelly and the engineering personnel devised a means for dumping the gurneys onto a movable table. The tables are rammed into the incinerator where the waste material was consumed. There is no exposure of personnel nor opportunity for conflagration.

Our chapter now is the proud possessor of the Emerson A. Brandt Memorial trophy for greatest increase, percentagewise, in membership during 1955, and we're sure going to work to keep it if possible. Our thanks go to Wayne Vanderflute, membership chairman, and Archie Waterbury and John Moyer who brought in so many new members. Two of these members attended the National Convention as our delegates, Vanderflute and Waterbury, and they gave us a very comprehensive and interesting report on all activities at our December 7 meeting.

Chicago

BILL O'REILLY

CHICAGO Chapter's Christmas meeting took place at the Central Cold Storage Company. Our host for the evening was Bert McKenna, chief engineer, who served a hot light supper. Everyone enjoyed it and had enough to eat. Nick Downes, chapter president presented to Bert McKenna, the small chapter trophy which we have won three times in succession. This trophy now belongs to the Chicago chapter.

Tulsa

BILL SWADLEY

MID-DECEMBER in Tulsa saw the local chapter get together for the election of officers for 1956. On December 13, the following named members were elected to responsibilities of guiding this chapter for the coming year: President, L. K. Wagner, engineer, Beatrice Foods; Vice-president, Jimmy Imel, engineer, Mayor Hotel; Secretary-Treasurer, Bill J. Swadley, engineer, Beatrice Foods. The educational chairman appointed was John Boyce of Palmer Supply. The Tulsa chapter meets on the second Tuesday of the month at the Palmer Supply Company, 1601 E. 4th Street. It has been some months since we have had an out of town visitor. Should any brothers be coming this way, they are invited to attend our meetings.

Stockton-Modesto

HARRY DYER

LIKE many other chapters, Stockton-Modesto held its election of officers for 1956 in December. Those elected for the coming term are: President, James Caylor, B. Zeff Co.; Vice-president, Kent Baumgardner, Tracy Ice & Development Plant; Secretary-treasurer, Harry C. Dyer; and Sgt.-at-Arms, Denis Desjardins, Stockton and Paul Skittone, Modesto, Pacific Fruit Express Co. Those appointed on the Educational Committee for Modesto are: Claude Kenworth, Merchants Refrigerating Co.; Jack Jackson, Fresno-Consumer Company; Waino Meinkinen, Pacific Fruit Express; Gaylor Lucas, Modesto Refrigerating Co.: Ted Hornbacker, Turlock Refrigerating Co., and Tom Woods. Those appointed for Stockton are John Panizza, M. L. Holland, Santa Fe Ice and Precooling Plant, and Guy Vancleave, Santa Fe Ice and Precooling Plant.

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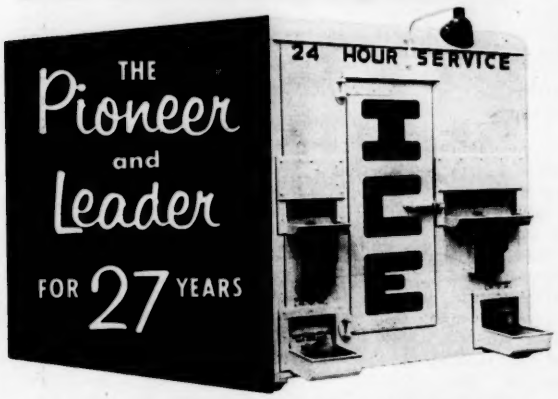
AND ICE VENDING EQUIPMENT



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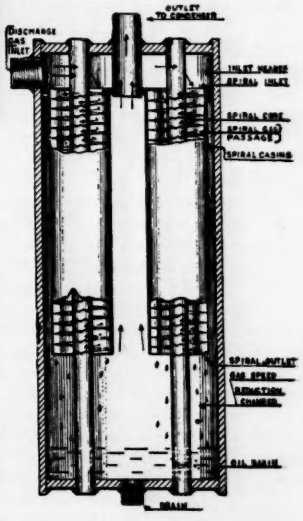

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Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

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We have our new 16 MM Sound Projector. Thanks to the members and to individual companies donating toward its purchase. We believe it will help educationally, and then too we can use it occasionally for entertainment.

Yakima

ELMER TOOP

WINTER is here and with it a few more members turn out for the chapter meetings, although most of them have been very busy with their refrigeration problems lately. At our meeting on December 14, this reporter was privileged to give an account of himself as a delegate to the convention. He was unable to report at the November meeting immediately following the convention as he had been too busy trouble shooting on a broken-down so-called automatic refrigeration plant.

Our December meeting had Harry Dodsworth as the speaker, with a talk on air conditioning of hospitals. Dodsworth centered his remarks on the engineer's responsibilities for keeping humidity at 65 to 70 r.h. in surgery. He explained where some doctors want 65 and others 70, which creates quite a headache for the plant engineer. At this meeting the members also voted a sum to the Venemann Memorial Fund.

Los Angeles

FRED HERR

LOS ANGELES Chapter, NAPRE, inaugurated its 1956 meeting schedule with a dinner and entertainment program at the Terminal Club on the night of January 4. Elmer A. Johnson, President called the group to order at 8 p.m., after the conclusion of a spaghetti-and-meat ball dinner. Before surrendering the presidential gavel to the new chief, Clifford P. Scott, Union Ice Co., Johnson thanked the members for their loyal and continuous co-operation during his administration, particularly for the tireless efforts in behalf of the outstanding event of his term—the national convention last November.

Johnson singled out the committeemen and their individual assistants and recited the work each had done in furthering the advancement of NAPRE during 1955. "NAPRE", he said "is something vital, something very important to all of us in the refrigeration industry. The outlook is promising and continuous growth for our chapter and the national organization is the prospect for 1956. I know you will all give the incoming president the same unselfish co-operation that you gave me last year. The members applauded enthusiastically when Johnson remarked on the administration of Regis Gubser as national president in 1955 and referred to it as the most progressive and productive in the history of NAPRE.

Mr. Gubser revealed that numerous letters had been received at national headquarters bearing high praise for the unexcelled manner in which Los Angeles Chapter put on the convention. He said the general opinion was summarized in a phrase in one letter from a mid-western member who wrote him: "Every detail of the convention, from the choice of the convention hotel, the quality of the technical speakers, the diversity of entertainment, and the genuine spirit of hospitality and cooperation offered by Los Angeles members, was so perfectly taken care of, that any one who finds anything to complain about would certainly be hard to please".

Out-going president Johnson then served as master-of-ceremonies in installing the new officers, and then inducted each of the other new officers, directors, and committee chairmen. No technical talk was scheduled for this meeting as the session is traditionally given over to lighter things. The entertainment committee presented a trio of interesting films. These were: "Sea Island", a Walt Disney, Academy Award, true life adventure; another dealing with the hunting of bear, moose and caribou in Alaska; and a third, a Kodachrome "Calendar Pictures for 1956", in which the NAPRE men were given an idea of what Marilyn Monroe's successors on the calendars look like.

Miami

CHARLEY MONEYPENNY

NEW officers elected by the members of Greater Dade County Chapter, NAPRE, on December 28, are as follows: President, Chas. M. Haller, Air Conditioning & Refrigeration Instructor, Technical High School; Vice-president, Pert J. Bergman, chief engineer, Miami Beach Federal Bank Bldg.; Secretary-Treasurer, Charles W. Moneypenny, chief engineer, Kenilworth Hotel. Committee chairman appointed were: Educational, Wm. Krause, refrigeration field engineer, Baker Smith Corp.; Membership, Wm. G. Robinson, engineer, Delano Hotel, and Publications, J. H. Crum, sales manager, Water Conditioners, Inc. Greater Dade Chapter meets the second and fourth Wednesdays at 1850 Alamanda Drive, North Miami.

Seattle

JOHN GRAINGER

A TURKEY dinner meeting scheduled for November which had to be postponed due to a snow storm was carried over to a Christmas turkey dinner meeting for December. It was a very successful meeting with almost 50 percent of the entire membership participating. Bob Harrison, the chapter instructor, gave a resume of the ground covered during this past year. There followed the reading of the treasurer's report, the election of a new member, Thomas P. Monroe of Petersburg, Alaska, and the election of officers. Guest speaker for the evening was Bob Carlsen of Arthur Forsyth & Co. of Seattle, who showed a cut-away and gave a talk on the Armstrong Purger.

By unanimous vote the following officers were elected: President, Howard Penor; Vice-president, James A. Soloman; Secretary-Treasurer, John Grainger; Master-at-Arms, Andrew Beckenbauer. The committee chairmen appointed were: Telephone, Bill Peck and Joseph Pierce; Program, for January and February will be Bill Allen, Jr., and for March and April, Frank Knowles. The chapter instructor will be the same as last year, Bob Harrison. Members voted to keep the dues at $6.50 and to have dinner served at the meetings. This practice was discontinued last year but attendance only fell off. (Grainger's report on the purger discussion will appear in March IR.)

Members-at-Large

FRANK CHASE

IN ACCORDANCE with the resolution adopted by NAPRE's National Board of Directors at the annual meeting held on November 11, 1955, it was the great pleasure of our National President and Secretary to present a certificate of Honorary Membership to Walter E. Bernd of Washington, D.C. The Directors took this opportunity to bestow an honorary membership on him out of respect for his many services and years of faithful affiliation with NAPRE. Mr. Bernd is a past National President of NAPRE.

It is hoped that members have read the 1955 *Operating Data Book* editorial entitled, "Wanted: Several Thousand Salesmen", which encourages us all to solicit new members. There are quite a few who could form new chapters in their own areas. Correspondence is cordially invited from anyone interested and Headquarters would gladly forward all necessary information.

In this regard, let's share an excerpt from a nice letter from member Joe Budge, James Budge Pty. Ltd., of Sydney, Australia: "I noticed in the excellent 1955 *Operating Data Book* that you wanted several thousand salesmen. You can add my name to the list as one. That leaves you several thousand salesmen almost, still required". He recommended Mr. L. Woodbridge, Northern Pear Growers, Ltd., Mooroopna, Victoria, Australia, as a member-at-large.

Appreciated by our national office staff was a complimentary letter from member Joseph A. R. Larson, East Keansburg, N. J. He expressed surpriise at the accuracy of the association's records and promptness of correspondence.

Minister Becomes Member

Newest associate admitted by NAPRE's Board of Directors is F. G. Minister, General Manager, F. C. Lovelock Pty. Ltd., Sydney, Australia. He writes: "Many thanks for your letter of December 19 in relation to my proposed membership in NAPRE, and I am indeed pleased to learn that I will be admitted as an associate member. May I take this opportunity of thanking the Board for their kindly consideration, and with best wishes for the coming year."

Mr. Minister also advised the decease of two other "Aussie" members, Eric B. Ebeling and F. E. Hansen, both formerly with his firm. NAPRE is sorry to lose these long-time friends and offers condolences to their families.

Comments on NAPRE Benefits

Although the following letter is from a chapter member Mike O'Hara, it is ex-

pressive of many members-at-large with regard to their feeling for NAPRE: "I do not know of a better way to start the New Year than by remitting dues. Am enclosing my check, $8.00, for 1956 dues and $2.00 for the Venemann Memorial Fund. Acts of this kind is one of the things that makes the NAPRE the success it is when other organizations are falling by the wayside. Having gained my technical knowledge the hard way—extension courses, evening classes, etc—causes me to appreciate these things more all the time. Incidentally, I had a nice Christmas card from Mrs. H. G. Venemann which was appreciated very much.

"We had a very successful year this past season here at Fairmont Canning, and I feel the experience I have gained is valuable. I am sorry I missed the convention last fall. This Superintendent's job takes me out of circulation somewhat. My heart still is in refrigeration, however. The key to production is right in the compressor room." This from Telbert Cutting, Winnebago, Minn.

Another interesting letter came from B. L. Sprunger, with Alloy Casting Co. Division at Champaign, Ill.: "I was pleased to receive your letter inquiring into the application of refrigeration in our plant. At the present time, however, we are doing nothing in our process requiring the use of refrigeration. At the present, my duties with the company are in the capacity of plant engineer, devoting only part of my time to the research and development division of the company.

"My original association with the company was for purposes of research and development of advanced casting process methods, necessitating special equipment and knowledge of refrigeration. Since the research project is sponsored by the United States Navy and Air Force, any work that we do is classified. If we do any work or release any information that would be of interest to NAPRE members and associates, I would be more than happy to pass that information on to you.

"I still retain an interest in my former position with the Lafayette Frozon Foods and Continental Freezer Corporation of Lafayette, Indiana, and would be happy to receive a schedule of the meetings of the Chicago chapter from President Nick Downes and Secretary Bill Tiffin. I have heard the late Professor H. G. Venemann of Purdue University speak of the activities of the Chicago chapter many times. He always looked forward to when he could attend one of your meetings".

New Orleans

MAX SOFER

ON December 14, Louisiana Chapter No. 2 elected officers for 1956. Since elections here always consume a lot of time, we were forced to eliminate the customary educational session. With M. D. Mancuso presiding, the Nominating Committee's recommendations were announced and nominations accepted from the floor. That's when the fun began.

The election judge and tellers had quite a job keeping track of the various nominations for the different offices. There were many more candidates than had originally been anticipated. Special interest was shown for the 1st Vice-president's job. Vernon Foret, John Mariakis and Max Sofer ran for this office. The five new directors also had a lot of competition with nine members battling for this position.

When all the chips were down, here is how the line-up of officers of Louisiana Chapter No. 2 looked! President, Damian Fischer; 1st Vice-president, Max W. Sofer; 2nd Vice-president, Joseph Arena; 3rd Vice-president, John Luck; Treasurer, George J. Whitman; Secretary, Leo J. Vivien; Financial Secretary, Eugene Orth; Sgt.-at-Arms, Hollis Haves. The Directors are: M. D. Mancuso, chairman, and F. X. Gillio, B. J. Mancuso, H. McGovern, F. Thomas and J. Vernaci. Our Educational chairman is M. G. Olivier.

Kansas Ice Plant Sold

THE only ice business in Wamego, Kans., which has been operated by the Wamego Seed & Elevator Company since 1919, has been sold, with the elevator business, to the Peddicord Bros., of Wamego. The new owners plan to continue the sale of ice. The ice plant was built in 1919.

OHIO SPECIAL ICE CANS

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Industrial Trucks

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NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Casting Information Wanted

QUESTION NO. 1089: In the November INDUSTRIAL REFRIGERATION, I notice a reference to investment casting and mercury castings. I am under the impression that a mercury casting is a type of investment casting. Would anyone care to explain how an investment casting differs from a molded sand casting?—F.K., Chicago.

ANSWER: The process of molded sand-casting is the one with which most of us are best acquainted. In its simplified form it consists of a wooden pattern which is placed in a container of sand and about which the sand is tightly packed. The pattern is then removed and molten metal is poured into the impression left by the pattern. It is difficult to control tolerances very closely and considerable machining is required for precision parts cast in this manner.

In an attempt to reduce machining time, a number of different casting processes have been developed. The "lost wax" process, investment casting, and mercury casting are all closely related ways of producing precision castings.

Generally, a permanent mold of steel or other material is made and an expandable pattern is cast in the molds, e.g., wax or mercury patterns. The pattern is removed from the permanent mold, and a shell of ceramic material is then molded around the pattern. When the pattern is melted out, the new mold is ready to receive molten metal. Parts cast in this manner can be held to close tolerances and require little, if any, machining.—H. P. HAYES.

Separating NH_3 from Oil

QUESTION NO. 1090: We have discussed many times the possibility of removing ammonia from crankcase oil and re-using the oil. Have any of your readers had experience along these lines? Is it possible and if so, how can I do it?—L.C.C., Green Bay, Wisc.

ANSWER:The problem of removing ammonia from crankcase oil taken from compressors was presented to our laboratory with the thought of removing the ammonia and then re-using the oil. Our technicians recalled that there are two chemicals which have a great affinity for ammonia — water and calcium chloride. Water was tried first. Five parts of water were mixed with one part of oil and agitated in a Waring blender. This method was found to be impractical because an emulsion was formed and the water with the ammonia could not be easily removed from the oil.

Next trial was a calcium chloride tower through which the oil was trickled. The tower was made of plastic tubing filled with calcium chloride pellets which had been washed with carbon tetrachloride. Analysis showed complete removal of ammonia.

Still another method was tried and that was simply heating the oil to 110 C (230 F) for 24 hours. This expelled the ammonia from the oil as complete as the filtering process. The pH of this oil was originally 7.0 or neutral while filtered oil had a pH of 5.0—slightly on the acid side—which would indicate some of the chloride had been picked up in the filtering process.

Corrosion tests were made by allowing pieces of brass and bronze to react with the various samples of oil as follows:

a) control (oil with ammonia)
b) oil filtered through calcium chloride
c) oil dried in oven

Oddly enough these tests showed no corrosion — even on the control.—B.S., Fairmont, Minn.

Air Conditioning Indirectly Using Sweet Water Medium

QUESTION NO. 1091: We are interested in doing some indirect air conditioning using sweet water. Can you give us the name of some engineer who has had experience in this line?—J.E., Tulia, Texas.

ANSWER: The term sweet water is not a common one in air conditioning. It has been used in dairy refrigeration to distinguish fresh water from brine ("See 'Refrigeration in the Dairy Industry' I.R., May 1955, Page 33, subhead, "Indirect Sweet Water System Gain Favor"). In air conditioning, it has always been common practice to use fresh water in indirect systems. The fact that water temperatures are above freezing eliminates the necessity for using brine and therefore eliminates many of the problems associated with brine. The ASHAE Guide, particularly Chapter 36, Ice and Cold Water Systems, and a number of other text books cover the subject of indirect air conditioning fairly well. Manufacturers of chilled-water coils also can provide you with some excellent data. —H.P. Hayes.

Seeks Standard Data For Compressor Test Comparisons

QUESTION NO. 1092: I have heard a number of sales engineers say that their compressors are better than their competitors of equal rating because they are more conservative in their testing. Aren't all compressors tested under standard code conditions? If not, is there any way I can tell who is conservative and who isn't?—C.E.C., Chicago.

ANSWER: The American Society of Refrigerating Engineers, has established a standard for rating and testing refrigerant compressors. A compressor may be tested under one or more of the following 13 standard groups: (See Table below)

The ASRE standard specifies that any published compressor capacity ratings based on definite refrigeration applications be accompanied by one or more ASRE standard ratings identified as such by group number.

If two manufacturers have complied with the standard test codes, you will have a fair basis of comparison. One thing you should note particularly is that the ASRE rating method shows a higher compressor capacity at the superheated vapor condition. This is because the superheating of the suction vapor is credited to the compressor as useful refrigeration.

It is possible also to compare two compressors on the basis of theoretical calculations to see which claims to come closer to the theoretical. When I was connected with the San Jose Chapter we did this a few times and got some interesting results. —H.P. Hayes.

Wants Insulation Envelope Around Building Exteriors

QUESTION NO. 1093: I have often wondered why insulation is put on the inside instead of on the outside of cold storage rooms. Wouldn't it be more desirable to stop the heat gain at the outer surface rather than to let so much heat into large masses of

Group No.	Saturated refrigerant vapor temperature entering compressor, F	Actual refrigerant vapor temperature entering compressor, F	Saturated refrigerant vapor temperature entering compressor, F
I	−10	65	100
II	5	65	100
III	20	65	105
IV	40	65	110
V	−10	15	95
VI	5	30	95
VII	20	40	100
VIII	40	55	100
IX	−40	−15	95
X	−40	−15	40
XI	−40	−15	0
XII	−25	± 0	40
XIII	−25	± 0	5

concrete and then trying to stop it at the inner surface? Also, if the large mass of concrete were kept cold, wouldn't it provide a good "flywheel effect" of stored refrigeration in case of a brief equipment failure?—A.C., Chicago.

ANSWER: I assume that your question refers to the heat transfer aspects of the problem and not to other practical considerations such as long-life, structural damage to insulation, moisture proofing, etc.

From a heat transfer viewpoint there could be some slight advantage to placing the insulation on the outside of the structure. It usually takes a number of hours before solar radiation absorbed at the outside surface is transmitted to the interior of the structure. If the outside air temperature drops fairly low during the night, some of the heat being transmitted through the wall could "turn around" and be lost to the outside air rather than be gained by the inside air.

There would probably be a greater tendency for this to happen if the insulation were placed on the outside of the structure. However, any advantage along these lines would not be sufficient to offset the other practical considerations mentioned in the first paragraph above.

With respect to the "flywheel" effect you mentioned. I would say that some advantage could be gained in this way. However, it would take extensive tests or calculations to estimate the amount of benefit obtained. My guess is that it would be slight.—H.P. Hayes.

New Questions

Accessory Inquiries

QUESTION NO. 1095: Will you please tell me where I can purchase the following items: Rupture discs for ammonia gas which will rupture at 225 lbs. to 275 lbs?—W.F., Mercedes, Texas.

Sulfur sticks for ammonia leak detection?—C.W., Seattle.

Doubts Heat Capacity Claims How Cold is "Cold As Ice"

QUESTION NO. 1096: Recently the following two paragraphs appeared in a suburban newspaper under the heading: How Cold is "Cold as Ice". "First off, 32 F, the freezing point of water might come to your mind. But that's just the beginning of the "coldness" of ice. Modern GAS refrigerators provide ice cubes that are really cold—ZERO DEGREES! "Refrigeration experts point out that 'cold' ice is most desirable because of the two-way cooling action it provides in drinks. They explain it this way: first, zero degrees ice cools the liquid by attracting heat until the ice's temperature reaches 32 degrees. Thereafter the ice begins to melt, causing a second cooling action. Where 'warmer ice' is used, the only cooling action comes from the melting and the drink becomes flat and tasteless quickly."

Now this is a little confusing after reading the following statement on page 47 of the November issue of Industrial Refrigeration, an article by Eugen Wilbushewich on Rapid Ice Freezing:

"But the fact still remains that every type of fresh water ice, whether in block form or small-sized, has a temperature near 0 C (32 F) and contains the equivalent of 80 calories per pound calories (144 Btu per lb); therefore it cannot provide any lower temperature than its natural capacity."

How can Zero F ice be better, or am I confused about this "capacity"

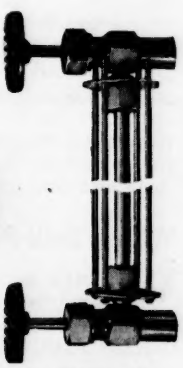
Use of Salt Dehumidifiers

QUESTION NO. 1097: I have heard of the use of flake calcium chloride in dehumidifiers for cooler rooms of cold storage warehouses. Can you give me any details on the construction and operation of these units?—W.H., St. Louis.

Electro-Filter Self-Charged

QUESTION NO. 1098: I have always thought that electrostatic filters require high voltage D.C. current to activate them. Recently, however, I have heard of a self-charging electrostatic filter. Can you tell me how one of these would work?—N.M.D., Chicago.

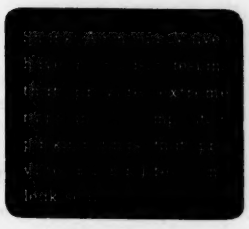
SHANK
AMMONIA
VALVES
Well Engineered—
Precision Built—



ALL-STEEL GAUGE SETS
with automatic shut-off of liquid in case of glass breakage.

RELIEF VALVES
for Ammonia and Freon. Positive relief action. Pressures from 75 to 300 lbs.

Largest line of Ammonia All-Steel Bar Stock Valves in the industry. Completely Cadmium plated.



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CYRUS SHANK CO.
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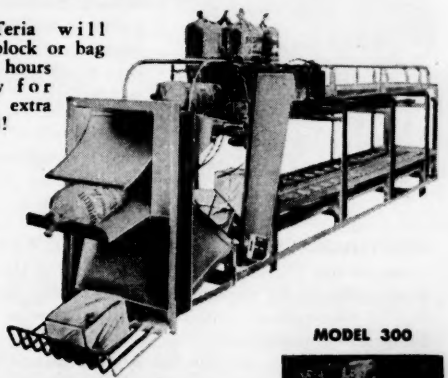
ICE VENDORS
FOR EVERY
REQUIREMENT

Ice-A-Teria will vend block or bag ice 24 hours a day for those extra SALES!



MODEL 300

PERFECTION
BAGGER-WEIGHER

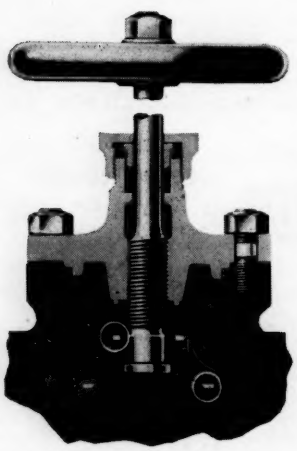
Speeds production, eliminates waste, cuts operating costs. Simplifies crushing and bagging, due to 300 lb. capacity of hopper. Fills and weighs 360 - 12½ lb. bags per hour. Adjustable for bag size, weighs 6 to 25 lbs. Portable, will clear any standard vault door.

PERFECTION
Ice Scoring Machine Co.
P.O. Box 2140
Fort Worth, Texas

YORK REFRIGERATION VALVES AND FITTINGS

posi-tive seal

—A TIME-PROVEN FEATURE OF YORK VALVES!



FACT: Of course York Valves have *positive seal* because York Valves have...

● Soft metal seating surfaces for main and back seat. ● Pressure seal between disc and lock nut. ● Seating surface bonded metallically to valve disc. No leaks—no loosening. ● Seating metal specially refined. Uniform and close grained. ● Seats match. Formed at factory with over a ton of pressure per square inch.

FACT: York offers the industry's most complete line—with pipe sizes from ¼ in. to 14 in.

CONCLUSION: These two facts help account for a third—more York Valves and Fittings are in use than any other make. If you're planning a new plant or an addition to your present plant—regardless of what make refrigeration equipment you use—call York. **(York Valves and Fittings are handled by York District Offices and York Wholesalers of Accessories & Supplies.)**

IT ALWAYS PAYS TO USE YORK ACCESSORIES AND SUPPLIES

Air Filters • Air Fittings • Automatic Controls • Brine Testing Sets • Can Covers • Can Dumps • Can Fillers • Charging Connections • Coils and Piping • Cold Storage Doors • Freon Refrigerants • Gas Masks • Ice Cans • Motors • Pumps • Oil • Oil Traps • Purge Devices • Receivers • Suction Traps • Valves and Fittings.

York

YORK CORPORATION

the quality name in valves and fittings

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

German Manufacturers and Marketing Group Visits U.S. Refrigeration Plants

SIX top officials of German refrigeration and marketing industry group visited the United States in January and February. The program arranged for them by the International Cooperation Administration, with Ed. Gilman, Jr. as project manager, afforded them a visit to a well diversified list of manufacturing plants producing complete refrigeration units as well as auxiliary equipment. Conferences were scheduled with trade associations, labor unions, engineering societies, marketing associations, and other organizations in order to obtain a comprehensive picture of American methods and operations.

Their study also included air conditioning and their related refrigeration apparatus. The project was self-financed by the German group and did not require any U. S. financial support. In their itinerary the group attended the TRRF and NARW Advance Management and Engineering Conference at Purdue University in January. Bert C. McKenna, Vice-president, NAPRE, addressed the group on American engine room procedures and practices, as one of the speakers of the Purdue Conference.

Frozen Grapefruit Sections

FROZEN grapefruit sections, when offered in retail stores, appeared to add to the total demand for grapefruit, a market test by the U. S. Department of Agriculture indicates. This is a relatively new grapefruit product.

This observation is based on findings in a retail store audit and a household survey conducted during a market test in Erie, Pa., August to November 1954, in cooperation with the Florida Citrus Commission. The test was designed to help the citrus industry determine whether this is a feasible form in which to market grapefruit and to learn the effects of various types of promotional activities. The promotional program, conducted by the Florida Citrus Commission, included advertising the frozen sections by newspaper, radio, television, displays, and distribution of samples in the larger chain and independent stores in Erie.

Wilson Sells Processing Plant

WILSON & CO. meat packers has sold its Chicago meat processing plant and 24 acres of land at 4100 S. Ashland, the company announced. The Learner Co. Oakland, Calif., and the Commercial Salvage Co. of Chicago were the buyers. Both are investment firms. They plan to use the property for future industrial development. Wilson has retained 17 acres of land at the site for its non-food divisions and distribution facilities for the Chicago sales area. The company will continue to occupy the property under lease until new facilities are ready for occupancy. All of Wilson's slaughtering operations were closed in Chicago in September and transferred to plants in Cedar Rapids, Iowa; Omaha, Nebr.; and Albert Lea, Minn.

Texas Ice Company Sold

THE Texas Ice Company, Beaumont, Texas, has been sold to The American Service Company, Atlanta, Ga., according to an announcement by H. I. Ward, president of Texas. The Company was established in 1919 and has been under the same management ever since. It will continue to be operated by American Service.

Armour Research Foundation Expansion

A $5,000,000 building program has been announced which will give Armour Research Foundation of Illinois Institute of Technology "one of the most complete industrial research centers in the world." The expansion program calls for the construction of three buildings and substantial additions to two buildings over the next ten years. The plans were outlined by Dr. Haldon A. Leedy, Foundation vice-president and director, at the University Club at a press dinner kicking off ARF's 20th anniversary observance.

Leedy said ARF expects to have a 50 percent increase in research volume and personnel within five years. He reported that the Foundation's research volume surpassed the $10,000,000 mark for the third consecutive time during the 1955 fiscal year, ended August 31. "It also was a year in which ARF performed research and development in connection with more industrial projects than ever before—a record 342 projects. In addition, the Foundation handled 170 projects for the government."

In reviewing the year, Leedy said outstanding contributions were made by the foundation in such varied fields as aerosol technology, titanium alloys, blast protection, and ceramic coatings. Other highlights included the creation of an engineering economics research department, expansion of the licensing program, and start of construction on the nation's first private nuclear reactor for industrial research.

New Refrigerated Cargo Service in Pacific

REGULAR refrigerated cargo service from New Zealand to Southeast Asia has been started by the Indo-China Steam Navigation Co. This service was begun with the Eastern Star, which will carry refrigerated cargo between Auckland, North Borneo, the Philippines, Japan, and Hong Kong. Another vessel for this service, the Eastern Argosy, was launched in September.

COMING CONVENTIONS

NATIONAL SOCIETY PROFESSIONAL ENGINEERS
February 17-18, 1956
Mayflower Hotel, Washington, D. C.

GEORGIA ICE MANUFACTURERS ASSOCIATION
February 21-22, 1956
Dinkler Plaza Hotel, Atlanta, Ga.
MILDRED NICHOLS, Secretary

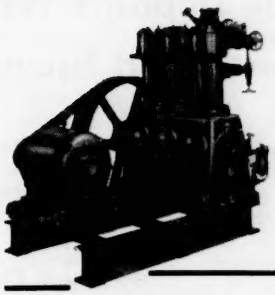
SOUTHERN ICE EXCHANGE
February 21-22, 1956
Dinkler Plaza Hotel, Atlanta, Ga.

NORTH CAROLINA ICE ASSOCIATION
March 12-13, 1956
Sir Walter Hotel, Raleigh, N. C.
LEWIS H. POWELL, Secretary-Treasurer

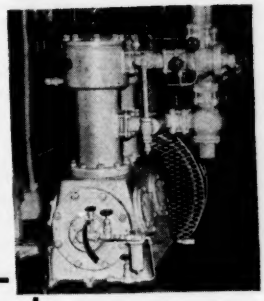
AMERICAN WAREHOUSEMEN'S ASSOCIATION
April 9-13, 1956
Hotel Statler, Los Angeles, Calif.
Wm. Dalton, Secretary

NATIONAL ASSOCIATION REFRIGERATED WAREHOUSES
April 9-13, 1956
Hotel Statler, Los Angeles, Calif.
Wm. Dalton, Executive Vice President

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
April 11 - 13, 1956
Benjamin Franklin Hotel, Seattle, Wash.
F. Marsh, Secretary



MODEL D IN SIZES
from 25 to 150-ton capacity



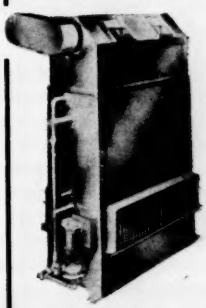
HOWE BOOSTER COMPRESSORS
For low temperature service.

THERE IS A
HOWE
COMPRESSOR
FOR EVERY SIZE LOAD
AND APPLICATION

THREE generations of Howe engineers have been helping the plant owner, design and operating engineer solve their refrigeration problems. The "know-Howe" behind the design and application of Howe equipment is geared directly to efficient refrigeration installations. Hundreds of repeat orders prove *it pays to know Howe!* Our engineers will gladly make recommendations . . . no obligation, of course.

WRITE FOR LITERATURE

RAPID FREEZE UNIT COOLER
Designed for blast and freezer storage



EVAPORATIVE CONDENSERS
10 ton to 200 ton capacity

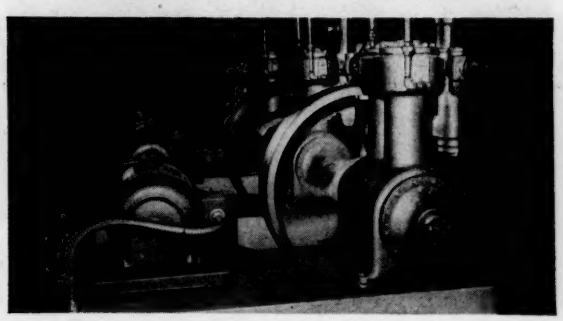
Since 1912, manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment.

HOWE ICE MACHINE CO.

2829 MONTROSE AVENUE CHICAGO 18, ILLINOIS

Distributors in Principal Cities • Cable Address: HIMCO Chicago

MODEL G — 5 TONS TO 25 TONS CAPACITY



Removing Scale Deposits With Safety For Operators and Equipment

MOST important feature about new products claimed to remove the most stubborn scale deposit without damage to equipment, is *the safety to the operator*. Manufacturers and users maintain that metal surfaces are left clean and bright, yet it is not necessary to use gloves, goggles or face masks in the application. Descaling of lines with acid — strong, dangerously handled acid — (Question No. 1087, December 1955, IR, page 45), is apparently no longer a necessary practice today.

Two firms, one a 52-year leader in the marine field and the other specializing in shoreside industries and power plants, announced these new "safe" descalers almost simultaneously. With each, a desire to market a non-irritating, non-toxic, and non corrosive compound, has prompted a number of years experimentation and research. Users report no etching of surfaces, and ready acceptance by operating or maintenance employees because of the harmless-to-humans qualities.

The products are marketed in crystalline form, rather than as a liquid. This solves the awkward handling problem with other high-acid content cleaners. Crystals are bagged in moisture proof sacks which are packed in drums. Each bag is a measured quantity to be mixed with water, thereby requiring no other weighing or measuring than the gallonage of water.

Application Procedures

Instructions for descaling operations seem to be simple. Typical procedure would be as follows:

Equipment should be boiled out or rinsed with untreated, fresh water, preferably hot, as a preparatory step. The unit to be cleaned should be washed several times to remove all traces of previously used treatments.

Cleaning compound required will, of course, depend upon kind and amount of scale, nature of equipment, temperature at which solution will be used and thoroughness of circulation. In actual cases, 100-ton evaporative condensers having 1/32 inch and less scale on cooling surfaces, required 150 to 200 lbs.; while a 100 hp boiler having 1/16 inch and less scale in it, required 300 to 400 lbs. Amounts would naturally decrease or increase according to size of equipment and scale to be removed.

Quantity of cleaner to be used at one time will depend upon the amount of water the equipment will hold while scale is being removed. For example, suppose that for a certain evaporative condenser it has been estimated that a maximum of 150 lbs. of descaler may be needed. Then, suppose that the pan of this condenser holds only 120 gallons of water.

In this case, start by using 80 lbs. dissolved in the 120 gallons of water. This 80 lbs. might prove sufficient for removing the scale. If not, a second solution could be used after the first had been used, exhausted and discarded.

General Instructions

In general, instructions and procedures require that the equipment be filled with water to almost the level at which the solution is to be used, leaving just enough room for the cleaner. Hot water is recommended. In jackets and condensers, get the water warm or hot by operating the compressor, etc. In the case of an evaporative condenser or cooler, disconnect the fan so the water will not be cooled by drawing air through it. Close the bleed-off so no solution will be lost.

Start the water circulating through the equipment and then add the amount of cleaner decided upon for use in the first run. In case of an evaporative condenser or cooler, it can be added by emptying into pan at the bottom. In case of shell-and-tube condenser, where compound cannot be added to the water, pump water continuously from an open drum into condenser and back to drum again. Add cleaner as water circulates through the drum.

Testing the Solution

One manufacturer, the North American Mogul Products Co., in an interview, indicated that a fresh solution of their compound has a pH of from 2 to 3. Test papers are supplied with each order, which show, when moistened, the strength of the solution. Their cleaner should be circulated until the scale is removed or until the solution has a pH of from 5 to 6, the point which indicates the solution is exhausted. If any scale remains, the equipment should be washed thoroughly and another fresh solution started. It has been found that the solution becomes exhausted in two to four hours, depending upon thickness of scale, temperature water, circulation, etc.

It is understood that the activity of these cleaners or compounds is that of penetration. The solution goes through cracks in the scale to the metal surface and so undercuts pieces of scale and detaches them. First, the ehxausted solution should be drained

Marine engine room employee demonstrates simplicity and safety of scale removal from heat exchange equipment by means of sulfamic acid cleaners. Note absence of gloves, goggles, mask. Photo Courtesy DuPont Magazine.

out and equipment thoroughly washed out with fresh, untreated water. No other kind of solution needs to be circulated.

Manufacturers ask that a complete description of equipment (make, model, size, type and kind) be sent with every inquiry or order. They also request the number of square feet of heating or cooling surface on which scale is deposited. In addition, equipment manufacturers' manual (where possible), and thickness of scale with sample, is requested.

Refrigeration Expedites Dye Manufacture

(Continued from page 20)

use around the plant. Exterior of the storage bin is enclosed with cement asbestos sheets to protect the equipment against the elements.

During negotiations for the installation, the question came up with regard to whether or not sub-cooled ice would absorb more Btu's than the product of the Pakicer system. The local engineer had comparative tests made by a consulting analytical chemist-physicist in Cincinnati. The results of the test disproved this theory for the Hilton-Davis application.

Frozen Food Sales Gain

(Continued from page 24)

essarily higher prices involved in selling boned cuts. The results? Kroger, which was among the first to stock the line, reported that its Detroit stores have been able to work up their frozen sales to a level where they account for 6.8 percent of total meat sales.

Another straw in the wind was supplied during the November convention of the American Meat Institute. The future of frozen meats was discussed then by a panel of practical meat men who concluded that a rapid expansion in sale of the frozen product might be expected in the next five years, and that, indeed, frozen meat might account for 10 to 15 percent of total meat sales by the end of that period. There was disagreement on the rapidity of the changeover; some predicted a more rapid expansion of frozen meats.

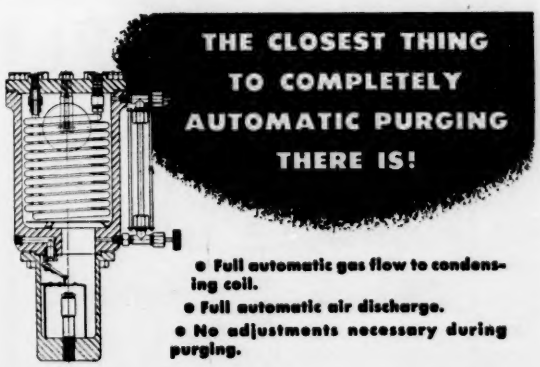
The thinking of the packers is colored. of course, by their desire to offer the housewife a branded product similar to other items sold in the grocery store. This is impossible when meat is sold fresh and unbranded. When certain economies that are possible when meat is cut and packaged at the factory are added to this urge, the reasons why the meat business may be on the threshold of a revolution in marketing practices become apparent.

South Pacific Chapter Elects Officers

THE PACIFIC States Cold Storage Warehousemen's Association (NARW's South Pacific Chapter), at its recent meeting at Yosemite Park, Calif., elected the following officers for the coming year:

President, Jack Urban, Los Angeles; First Vice-President, Wm. Giacomazzi, Jr., San Jose; Second Vice-President, W. J. "Buck" Mills, Los Angeles; and Treasurer, Harold Hacke, San Francisco. Regional vice-presidents elected were: Ralph Parker, Los Anegeles, (South); and Louis Arata, San Francisco, (North).

Members of the Board are: Paul Ashley, Fresno; A. R. Carstensen, Sacramento; Charles Condrey, Modesto; Hy Hinman, Oakland; Ralph Merkens, San Jose; Harlan J. Nissen, Los Angeles; Vernon Ogburn, San Francisco; Martin Schinnerer, San Diego; Jay Snow, Los Angeles; and M. W. Young, San Francisco.—NARW Cold Facts.


THE CLOSEST THING TO COMPLETELY AUTOMATIC PURGING THERE IS!
• Full automatic gas flow to condensing coil.
• Full automatic air discharge.
• No adjustments necessary during purging.

Armstrong forged steel purgers with automatic air and non-condensible gas discharge relieve engineers of guessing as to when the system is completely purged. Unit allows only non-condensibles to escape, saves on refrigerant.

Since no adjustments are required during operation, the engineer is free for other duties.

The purger can be operated continuously or intermittently. Send for free 4-page Bulletin No. 2211—Learn how Armstrong Purgers cut refrigeration costs, write:

ARMSTRONG MACHINE WORKS
860 Maple Street • Three Rivers, Michigan
Satisfaction Guaranteed

Better check on Armstrong High Side Floats and Liquid Seals, too!

Southern Ice Defers Quarterly Dividend

DIRECTORS of Southern Ice Company have deferred voting the quarterly dividend on the $7 preferred stock that normally would be paid on January 3. The company said it had decided on this action because of operating losses this year brought about largely by the complete loss of car icing and other ice tonnage due to a freeze in March.

Sunday Magazine Plugs Ice

IN THE "Quiz 'Em" section of the December 11 issue of "This Week", the following answer from D.M. of Westport, Conn., was given to this question — "With the old fashioned ice box virtually out of use, how is the ice business faring?"

"Today's iceman is busier than ever. There are 1,500 more plants in operation in the United States than in 1925. More ice than ever before is delivered to industry and commercial users, and to the country's 8,000 vending machines."

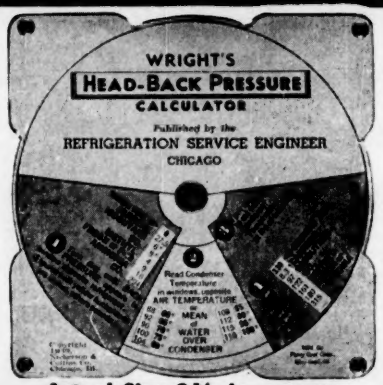
News travels, and so does publicity. The facts carried here were originally released in the Financial Section of the New York Times in October. Much of the basic information for the original story was furnished by the National Association of Ice Industries.

Southland Promotes Safety Through Large Sign

This sign, installed on the south side of the Southland ice plant at Fort Worth, Texas, is located where all the drivers and other employees see it each day when reporting for work — a daily reminder of the importance of safety. It is a part of the safety program inaugurated by Frank McConnell, manager of the Fort Worth plant.

BOWER
B B BRAND
AMMONIA
Anhydrous Ammonia
OVER
A CENTURY
OF SERVICE
IN CHEMICALS
1855-1956
Est. 1858
HENRY BOWER CHEMICAL MANUFACTURING COMPANY
29TH AND GRAY'S FERRY ROAD
PHILADELPHIA 46, PA.

A Handy Tool - WRIGHT'S HEAD-BACK PRESSURE CALCULATOR



Actual Size 3½ in. square

The Head-Back Pressure Calculator quickly determines the proper head pressure, for various refrigerants when the suction pressure, room temperature or mean water temperature is known.

Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all enter in determining the proper head pressure.

Post Paid $1.00

NICKERSON & COLLINS COMPANY
433 N. Waller Ave. CHICAGO 44, ILL.

Book Review

AIR CONDITIONING - REFRIGERATING DATA BOOK - DESIGN VOLUME. Milo M. Bolstad, Editor-in-Chief, Professor of Mechanical Engineering, University of Missouri. Published by The American Society of Refrigerating Engineers, 234 Fifth Avenue, New York 1, New York, 1955-56, 980 pages, 6½ by 9 in., leather-type cover. Price $10.00. For sale by Nickerson & Collins Co.

This is a ninth edition; it contains 39 chapters. The chapter on Air Distribution has been completely rewritten. Part 1 of the chapter on Controls has been rewritten to give a much fuller coverage of expansion valves and other refrigerant control devices. In many other chapters substantial revisions were made to bring the subject material up-to-date. The 60 authors and associate editors were each chosen because of their experience and eminence in the particular fields. This method of selection plus the ASRE Technical Committee critical review procedure has resulted in obtaining in each chapter the consensus of those best qualified in their respective fields.

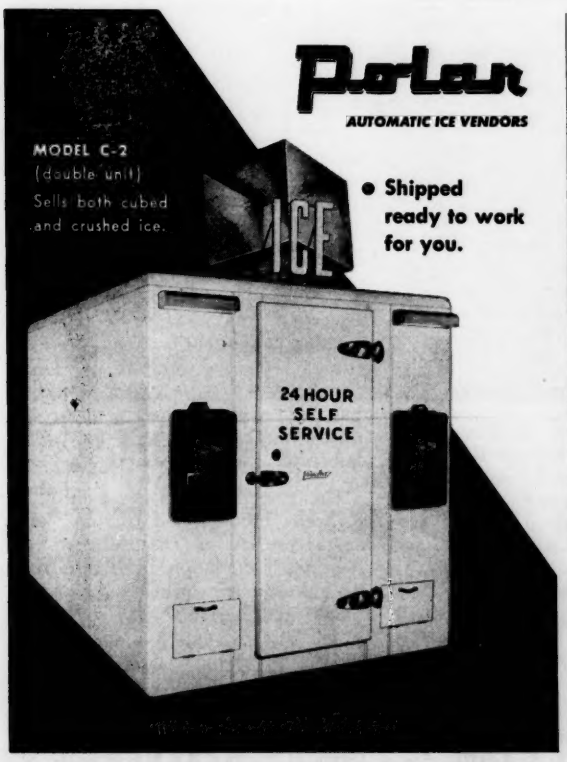
In this Design Volume is detailed the fundamental data and basic engineering information concerned with the theory and principles of design of air condition and refrigeration equipment and systems. It includes sections covering theory, physical data, application design, basic equipment, auxiliaries and self-contained units, operation, tables and miscellaneous. There are 400 illustrations and 240 tables. In addition there is a Classified Section listing manufacturers of components and assembled units. It should interest design and application engineers, architects, consulting engineers, executives, industrial power engineers, students, etc.

Boehmer Addresses Chicago ASRE

AIR conditioning of churches and motels was the topic of the major address given before the January meeting of Chicago Section ASRE by A. P. Boehmer, Chief Engineer, Dole Refrigerating Company. Boehmer, a member of ASRE's Research Committee, presented application details of latent heat systems as used for air conditioning. The discussion covered methods of calculations, installation and operation.

The speaker pointed out a disadvantage encountered in air conditioning churches due to the occasional occupany nature of the establishment. This causes rather high demand peaks which in turn involve heavy tonnage, large and expensive equipment, and considerable economical investment both initially and for operating the conventional system. Latent heat application to edifices such as churches and to commercial establishments such as motels reduces the peak to a constant operating level, resulting in smaller tonnage demand and, therefore, smaller equipment and drastically reduced operating costs.

As an example, Boehmer cited a small church edifice which would normally require a 50-ton installation to comfortably cool the building for Sunday services. The compressor motor alone would have brought about a demand on the local power facilities which would have been invoiced monthly at $85.00. By installing a 10-ton ice building system with self-contained condensing unit, chilled water circulating pumps, etc., the demand charges came to $9.00 per month. The implied savings of over $75.00 per month, estimated on six month's use only, saved the congregation nearly $500.00 annually.



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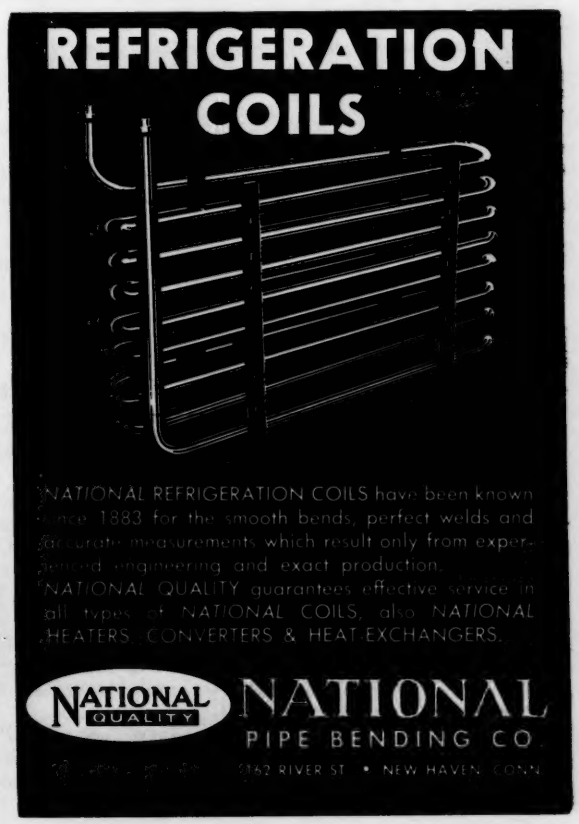
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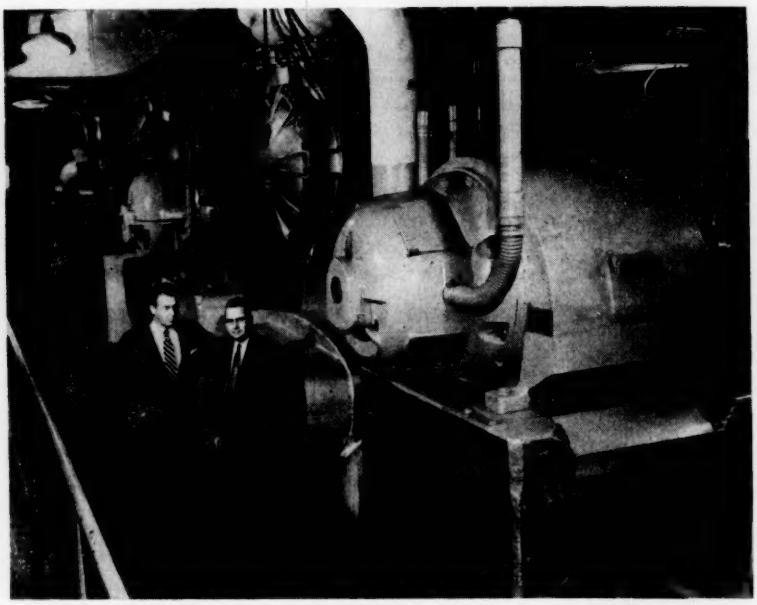
Merchandise Mart Cooling Plant Enlarged

THE BIGGEST air conditioning system ever installed in a single commercial building is about to become even bigger, it has been announced by Carrier Corporation, leading air conditioning manufacturer.



Array of cooling machines in Merchandise Mart building. Walter A. Stahl (right), operating manager of the building and (right) William Bodinus, Chicago district manager for Carrier Corp.

Charles V. Fenn, vice president, Machinery and Systems Division, said Carrier had received a contract to enlarge the cooling plant in the Merchandise Mart, Chicago, already the world's largest for a commercial structure, by the addition of a new centrifugal refrigerating machine.

Some 13 machines have been installed in the Merchandise Mart since the first machine was ordered back in 1935. At that time, Mr. Fenn noted, office building air conditioning was relatively new. Three of those put into service during the 20-year period were subsequently replaced by larger machines, bringing the total number of units when the new installation is completed to ten.

Heat from inside the building is transferred to condenser water used in the centrifugals. This water is brought in from the adjacent Chicago River. Carrying absorbed heat, it is returned to the river 60 feet below the point at which it enters the Mart. Chilled water supplied by the refrigerating machines is circulated to conditioning units consisting of fans, coils, heaters, filters and spray apparatus for cooling or heating, humidifying or dehumidifying and purifying the air.

Capacity of the new unit will be equivalent to 1,130 tons of ice melting daily. The additional machine will boost the record overall output of the cooling system to 8,500 tons of ice, equivalent to 250 railroad boxcars full every 24 hours. The contract marks the concluding phase in a step-by-step 20-year program to air condition the building, according to Walter A. Stahl, operating manager. The Merchandise Mart is the world's largest commercial office building.

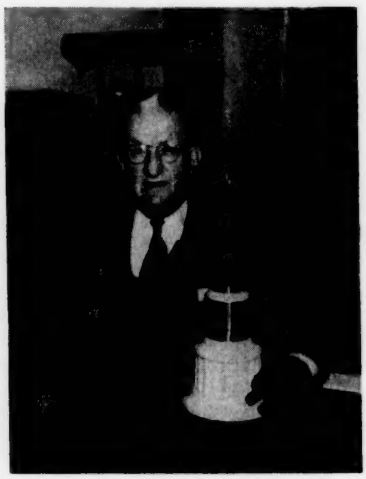
New Manhattan Officers

SEVERAL changes in the office personnel of Manhattan Refrigerating Co., New York, and Union Terminal Cold Storage Co. Inc., Jersey City have been announced by President John Q. Adams. Officers of the companies are as follows: President, John Q. Adams; Vice-President, and Asst. to the President, Joseph K. Storer; Treasurer, F. J. Steigerwald; Vice-President and General Manager, John J. Byrne; Vice-President, L. S. Hutchison; Secretary, Asst. Vice-President and General Manager, Paula A. Lavin; Assistant Vice-President, Joseph V. McAuliffe.

News of People

Herbie Hess Honored

A SPECIAL Award was presented to Herbie Hess by the Refrigerating Machinery Association of Chicago at their annual meeting on December 8, 1955. This award in the form of a huge Gold Loving Cup carried the following inscription, "To Herb Hess, Executive of The Year".



Herbert Hess with gold loving cup presented by Chicago R.M.A.

As the Secretary for Chicago R.M.A., Herbie's humorous letters requesting attendance at the monthly meetings stirred up a new attendance record and revitalized the social aspect of the local Refrigerating Machinery Chapter. Herbie, who possesses the rare ability to be humorous yet serious at the same time, combines this talent in his job with The Creamery Package Mfg. Company's General Office, where he keeps 'em smiling while attending to Refrigeration Sales Service matters. Mr. Hess has been with the Refrigerating Industry for more than 37 years, the last fifteen with Creamery Package.

GILBERT J. STECKER, Louisville, Ky., has been elected treasurer and asst. secretary of The Refrigeration Research Foundation, to serve during the unexpired term of Kenneth Stepleton, Chicago.

The election also is announced of Charles E. Adams, Jersey City, N.J., and James H. Kuehn, Milwaukee to the executive committee of the Foundation to serve out the unexpired terms of Richard C. Muckerman, St. Louis and Kenneth F. Stepleton, Chicago.

New Engineering Firm Patterson & Davis

A NEW engineering firm of Patterson & Davis is announced by V. C. Patterson. Several months ago Mr. Patterson withdrew from the engineering firm of V. C. Patterson and Associates, Inc., in York, Pa., to devote full time to Patterson Freezer Corp. as president. A short time thereafter, Proctor & Schwartz, Inc., Philadelphia, became interested in continuous plate-type freezer and other equipment, and have completed an exclusive licensing agreement whereby they will manufacture and sell equipment under Patterson Freezer Corporation patents.

William W. Davis, for the past ten years, was construction engineer for Sears, Roebuck and Co., responsible for the design and construction of retail stores, etc., throughout the thirteen northeastern states. Mr. Davis is a registered professional engineer in the states of New Jersey, Pennsylvania, New York, Connecticut, Massachusetts, Delaware, Maryland, and the District of Columbia. His long experience in building layout and construction, combined with Mr. Patterson's experience in refrigeration and freezing equipment should enable the firm to do a complete engineering job in connection with refrigerated warehouses, frozen food and ice cream plants.

DEATHS

JOHN FRANCIS EGAN, SR., retired general traffic manager of the American Refrigerator Transit Co., died of a heart ailment at Missouri Pacific hospital, St. Louis. He was 68. Mr. Egan had been with the company for 50 years, until his retirement last March.

Horace R. Tolle

THE DEATH of Horace R. Tolle, treasurer and manager of Citizens Coal and Ice Co., Mattoon, Ill., occurred Sunday December 25. Mr. Tolle was an active member of the Illinois Association of Ice Industries and served as president some years ago.

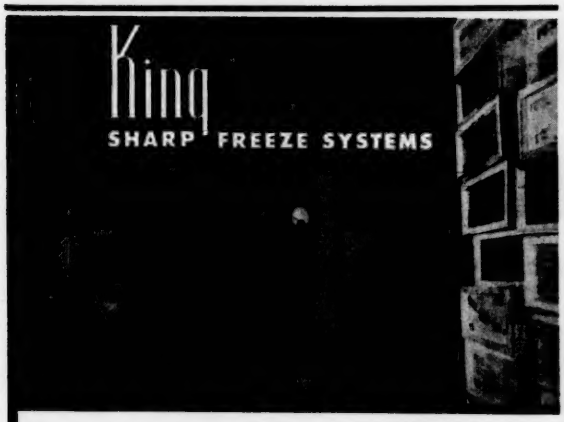
JAMES F. AIKLEN, veteran ice company operator at Vicksburg, Miss., died recently at his home in Vicksburg after a long illness. He was 81. He joined the Vicksburg Ice Company in 1911 and served with this company until his retirement a few years ago.

CATALOGS AND BULLETINS

Shank Catalog Available

THE eighth edition of Shank's catalog, which encloses new price schedule for ammonia valves and fittings, made its appearance in the last quarter of 1955. Cyrus Shank Company, manufacturers of refrigeration valves, accessories, announced at that time that the list prices remain the same with two exceptions. However, discounts have been lowered thereby increasing the cost of valves approximately 5 percent. The increase was effective on all orders received after October 15.

Tee valves and expansion valves now have a page of their own, and several new sizes have been added to existing lines. Shank will be glad to supply relief valve capacity ratings upon request. The new catalog will also be furnished promptly.



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More than 400 plant operators here and abroad have chosen King Systems for more efficient bulk freezing jobs for bigger profits. King Systems give you increased cold-room capacity, faster freezing, engineered distribution of air, continuous operation with no costly defrosting shut-downs, retention of product flavor and quality, lower power costs, a quick-freeze system designed for your specific needs.

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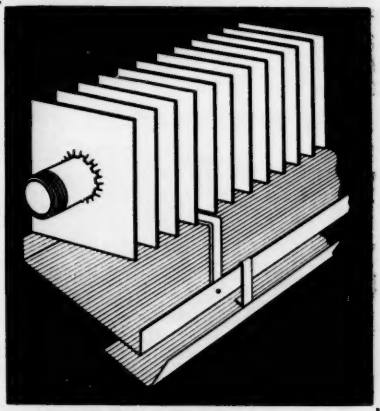
907 N. CEDAR ST. OWATONNA, MINNESOTA
MANUFACTURERS OF SHARP FREEZE COOLING, VENTILATING AND HEATING SYSTEMS

This new finned pipe is available in lengths of 5', 6'8", 10' and 20' — and with fin spacings of 1" and 1½" — to fit every application.



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Square-finned Pipe

Is ideal for cold storages, freezers, food processing and meat packing plants, etc. Manufactured from 2" dia. F.W. steel pipe and 7" square 14- gauge fins, Frick finned pipe gives maximum heat transfer per dollar invested. Each fin is bonded to the pipe under tons of hydraulic pressure. All assemblies are hot-dip galvanized.

These new Frick finned coils require only one-quarter of the space needed for bare pipe having the same surface. See your nearest Frick Branch or Distributor for complete details, or write for Bulletin 158.

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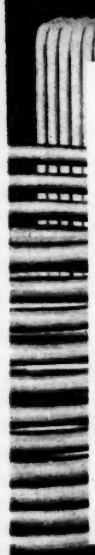

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It costs you less, much less. Installation is faster, easier. It lowers maintenance costs. *Believe this!* Send for facts on how it can save money and give you better performance.

The new Watkins Recirculator does this: (1) eliminates liquid pumps. (2) boosts system efficiency. (3) provides full flooding and PROTECTS against slugs. (4) allows quick, hot gas defrosting.

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Symbols For Drawings

A NEW rigid vinyl template which contains the cutout symbols of all approved ASA-Z Standard heating and air conditioning diagrams has been designed by A. Lawrence Karp, 16 Putnam Park, Greenwich, Conn. A pencil or pen can be run through the sharply engraved symbols of convectors, condensers, heat exchangers, cooling towers, evaporators, valves, vents, vibration absorbers, receivers, traps, floats, filters and compressors. Several large companies who tested the template reported that it relieves engineering and drafting personnel of routine diagramming. Even green trainees and students were able to produce accurate, uniform, drawings.

MANUFACTURERS' NEWS

Buckley Advanced by Pittsburgh Corning

THE appointment of Robert E. Buckley as Assistant General Sales Manager has been announced by the Pittsburgh Corning Corp. Mr. Buckley, formerly district manager of Pittsburgh Corning's Philadelphia office, will be located in the company's general office in Pittsburgh and assumed his new position as of January 1. A graduate of the University of Pittsburgh, he has been associated with the company since 1947. He is a member of the Illuminating Engineering Society and the Engineers' Club of Philadelphia.

Bower Chemical Presents 100th Anniversary Booklet

TO OBSERVE its hundredth anniversary, the Henry Bower Chemical Manufacturing Company, Philadelphia, Pa., issued a very attractive historical booklet. The company was established in 1855 by Henry Bower at the age of 22, who was its president until his death in 1896. He was succeeded by his son George R. Bower and in 1919 following his death, by William H. Bower, and in 1940 by Henry Bower. This company from its founding until the present has been guided by the founder and succeeding generations of his family.

Regarding early developments by the company, the booklet points out, agronomists who consider high test nitrogen fertilizer the last word in modern fertilizers will be surprised to learn that as far back as 1866 the Bower Chemical Works was advertising a "complete manure" containing ammonium sulphate among other chemicals, thus anticipating modern fertilizers by over ninety years. It was too far in advance of its times however and in 1877 the venture was abandoned.

An outstanding achievement was the company's long-time work in furthering the uses of ammonia in its many forms having dealt continuously in one or more of these ammonia products since 1858. One of the interesting phases of the Company's development was the utilization of waste products in the manufacture of chemicals; including liquid from the condenser and washer from a gas plant which formed the basis for ammonium sulphate; sulfuric acid made from iron pyrites, the spent iron pyrites later being sold for their copper content; potassium ferrocyanide made from waste cattle hoofs and horns and waste leather with leached wood ashes. Other interesting phases include the long struggle to establish the manufacture of chromium chemicals.

The booklet is quite well illustrated with old-time photographs, and portraits of all the officers from the time the company was founded, and brief personality sketches of the older employees. It is quite tastefully arranged and printed and provides a very fitting tribute to this pioneer family business concern.

Fuller Buys Sutorbilt

THE Fuller Company, Catasauqua, Pa., has acquired all of the outstanding stock of the Sutorbilt Corporation of Los Angeles, Calif. The positive pressure blowers manufactured by Sutorbilt Corporation broaden the line of air compressors and vacuum pumps now manufactured by Fuller Company, and greatly enlarge its market throughout industry, as well as in water purification and sewage disposal plants, and for ventilating large tunnels.

Fuller also manufactures a line of pneumatic conveying equipment, coolers, preheaters, and feeders to handle dry granular materials, for the cement industry and other industries, including concrete products and ready-mix, chemical processing, food and feeds, pulp and paper, breweries, rubber, and plastics.

The Sutorbilt plants will also allow the Fuller Company to manufacture certain of its products there for West Coast delivery; and many products, manufactured by Sutorbilt Corporation, can now be manufactured in the Fuller plants in Catasauqua and Manheim, Pennsylvania.

Hubbell Names New Western Representative

THE appointment of Milmac Corporation (A. J. MacJeannett, Millard D. Bostock, H. Wm. Baker) 280 Seventh Street, San Francisco 3, California, as sales representatives for Northern California and Reno, Nevada, is announced by Hubbell Corporation, Hawley Road, Mundelein, Ill., manufacturers of automatic back pressure regulators, solenoid valves for refrigeration, air-conditioning, and industrial application. Milmac will carry a representative stock of Hubbell controls and accessories as well as repair parts.

Watts District Manager for United Cork Co. at St. Louis

NEW district manager for the St. Louis branch office of the United Cork Company is Thomas H. Watts, according to an announcement by H. Bose, president, early in January. Watts has been sales engineer in the company's Chicago office for 16 years prior to this appointment. The first project under his immediate supervision at St. Louis will be the insulation of the new Merchants Refrigerating Warehouse.

Thomas H. Watts

Watts is a graduate of the University of Illinois and has a degree in industrial administration. In addition to his insulation experience he had five years of service with the U.S. Army Signal Corps. He is a member of the Chicago Section ASRE and the Chicago Builders Club. His bass voice will probably be a welcome addition to one of the SPEBSQSA Quartets of St. Louis.

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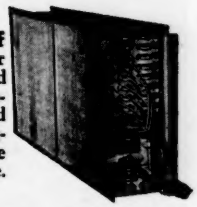

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87 Walton St. Atlanta, Ga.

USED EQUIPMENT—wanted & for sale

WANTED — Ammonia receiver, 3 to 4 ft. in diameter, 10 to 12 ft. long, code constructed. Submit specifications with price. Freezer Industries Inc., 3755 S. Racine Ave., Chicago 9, Ill.

FOR SALE — 8 x 8, Y 30, high speed York ammonia compressor complete with grooved fly wheel and V-belts, also several used motors from 3 to 10 h.p., and a 60 h.p. D.C. The Gus A. Regnier Refrig. Engineering Co., 532 Winchester Ave., P.O. Box 1093, New Haven, Conn.

FOR SALE — WATER COOLING SYSTEM
Ammonia York latest type 7½ x 7½ 2-cyl., pressure lubricated compressor, 60 h.p., A.C. motor, S&T water cooler, S&T condenser, large receiver, all ASME, two 10 h.p. Buffalo pumps with motors.
EUTH-LAMBRECHT COMPANY
2364-17th St. Detroit 16, Mich.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois, WAbash 2-3299.

FOR SALE — 225 h.p., 300 r.p.m., Fairbanks Morse type E14 modernized V-belted to 150 KW., 3 ph., 60 cyl., 440 volt, complete with all auxiliary, etc. $5,000. Also 60 and 90 h.p., 220 volt V-belted 450 r.p.m. sets and other equipment. J. B. Sims, 538 Woodlawn Ave., Grand Haven, Mich.

FOR SALE
Complete ice making plant, 624 cans-8 can pull.
10 x 10 York 100 h.p. synchronous motor.
9 x 9 York V-belt drive to 75 h.p. motor.
8 x 8 Frick V-belt drive to 50 h.p. motor.
3¾ x 3 6-cyl. York 25 h.p. motor.
100 h.p. Unaflow steam engine connected to 10 x 10 York.
Brine coolers, condensers, ice breakers.
FREON EQUIPMENT
2- 8 cyl. V/W compressors each 125 h.p., 600 r.p.m.
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1- 250 ton evaporative condenser.
JOHN F. CARSON
A & Venango Sts., Philadelphia 34, Pa.
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USED EQUIPMENT—continued

FOR SALE — 4x4, 5x5 Frick compressors. 5x5, 8x8 Yorks. One 20" x 7' York receiver. 15 ton York Freon compressor. Write E. Niebling, 1546 St. Clair Ave., Mount Healthy, Cincinnati 31, Ohio.

FOR SALE — 1344 feet of FINNED PIPE — 12' lengths. Made from 2" pipe — 7" fins — 1½" apart. All heavily galvanized. NEW at half price. Also 150 steel hand trucks — roller bearing wheels, $6.00 each new. West Side Cold Storage Co. 7 Harrison St., New York 13, N.Y.

FOR SALE — 1 U.S. Hoffman air blower 300 CFM direct connected 5 h.p. motor, 3600 r.p.m.; good as new. 3 Vertical 5 h.p. motors, good running condition. 1 Gifford Wood 300 lb. scoring machine, good running condition. 1 — 9x9 Frick compressor, belt connected 75 h.p. motor with starter and unloader. Carlisle Hygienic Ice Company, P.O. Box 282, Carlisle, Penna. Telephone 735.

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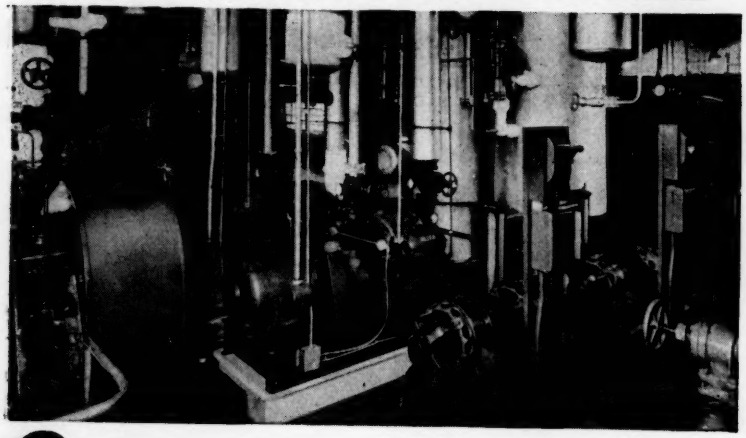
. . . don't waste it by looking around for personnel or items to make your organization more efficient. A classified ad in Industrial Refrigeration will do the job for you quickly and at low cost. No matter what you need or have to sell, one of our readers will have it or want it. The same goes for personnel. Rates are shown at the beginning of this section — closing date is the 5th of the month.

May we serve you?

Merchants Ice and Cold Storage Company, relies on performance-proven Vilter equipment.

The two Vilter ammonia booster compressors which were placed in operation recently.



Q- Why was Vilter Refrigeration Equipment again selected by a large Louisville Cold Storage Plant?

A. because Vilter REFRIGERATION costs less to own*

Performance is its own best recommendation. For twenty-four years two Vilter horizontal, triple suction, multiple effect ammonia compressors performed efficiently and dependably with a minimam of maintenance for the Merchants Ice and Cold Storage Company, Louisville, Kentucky.

This accomplishment was all the proof needed for this storage company to install recently two new Vilter VMC Booster Compressors. Additional refrigeration capacity was demanded to meet the increasing needs for freezing and storing frozen foods.

Other Vilter equipment installed here includes: a gas and liquid cooler, a suction accumulator and vaporizer, a rotary liquid pump, fin coils, and eight air units.

All this equipment has performed to the highest expectation of the customer.

It will pay you, too, to standardize on Vilter refrigeration and air conditioning equipment for your operation.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

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QUALITY CRAFTSMANSHIP that lasts . . .

ENGINEERING DESIGN that guarantees performance

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OPEN LETTER

to the men who build or buy cold storage space

This is the story of a trend in your business and what's in it for you. The trend is to Fiberglas* for the insulation of cold storage space—here's why . . .

—First, of course, is performance. Fiberglas Insulations are amazingly efficient. Thermal conductivity (k) is as low as .24 Btu at 50° mean temperature, and low heat capacity is a big help in maintaining *accurate* temperature control. Fiberglas has proven its efficiency in large freezer plants and small coolers over the past 15 years.

Performance is good—but there's much more than this behind the swing to Fiberglas.

There's money—money in the form of major savings. For equal or better insulating effectiveness, Fiberglas-insulated coolers and freezers generally cost less to build than structures insulated with other materials. With costs of other insulating materials on the rise, Fiberglas Cold Storage Insulation prices have remained level.

You save on construction costs because Fiberglas materials are light in weight, easy to handle, easy to cut and apply with standard insulation techniques. No basic design changes are needed when you specify Fiberglas for existing plans.

You save on maintenance. By their very nature, all Fiberglas Insulations are ideally suited to the conditions under which they work. Made of fine fibers of glass that are non-absorbent; they will not rot, mildew, warp or expand. They offer no food to rodents or insects, they do not give off or absorb odors. In short, Fiberglas Insulations are as durable, as sanitary as a cold storage insulation can be.

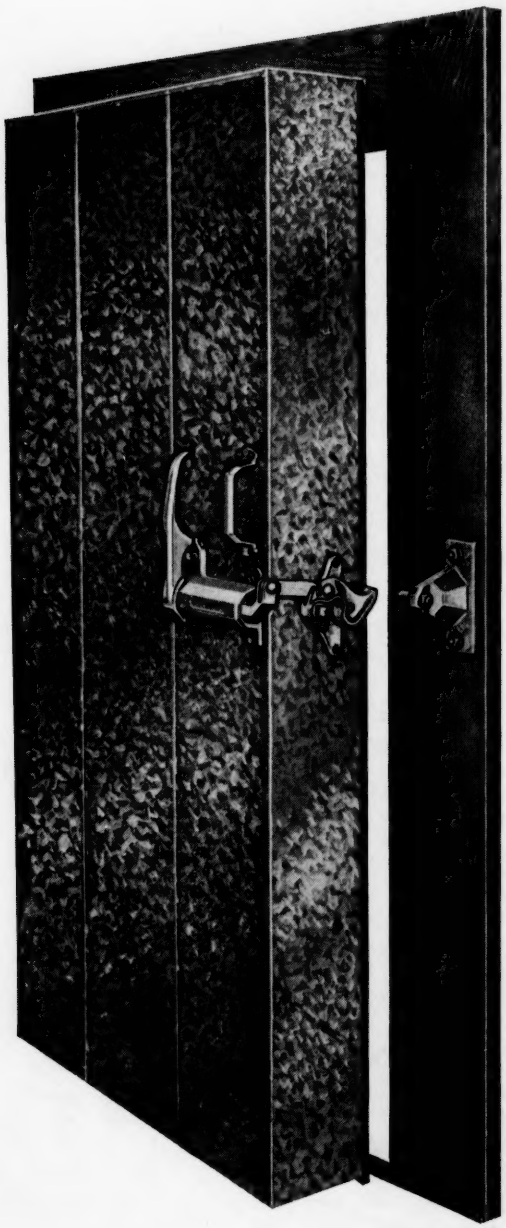
And they're available. No matter what your cold storage needs, there's a Fiberglas Insulation that fills the bill—and you can always depend on Fiberglas to come through with the materials when you need them. What's more, the counsel of well-qualified insulation specialists is always available too, to help you work out *your* design problems.

The trend is under way, promising to become a full-scale revolution. There never was a better time to prove out for yourself just how well Fiberglas Insulations measure up to the job of cold storage insulation. Product information and records of outstanding performance over a 15-year period have been put together for you in an informative bulletin. Write: Owens-Corning Fiberglas Corporation, Dept. 198-B, Toledo 1, Ohio. Or pick up the phone and call the nearest Fiberglas branch.

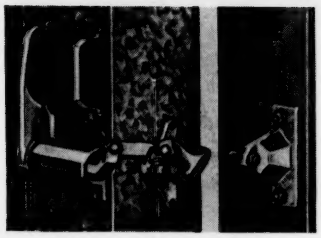
*T. M. Reg. by Owens-Corning Fiberglas Corporation

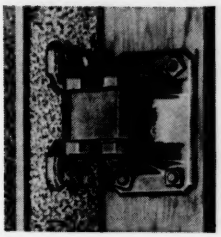
Allan W. Cox

Manager, Low Temperature Insulation Sales
Owens-Corning Fiberglas Corp.



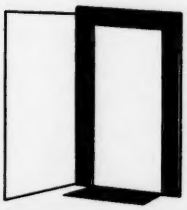
For The Finest Cold Storage Doors Specify JAMISON with these exclusive features





Exclusive JAMISON Hardware

- Rugged cast construction
- Patented heavy duty design
- Adjustable hinges and fastener assure tight seal during life of door
- Hot dip galvanized finish. Heavy coating of prime zinc gives maximum protection.



Exclusive JAMISON FROSTOP (optional feature)

- Prevents frost or ice on door frames even as low as —50°
- Prevents door from freezing shut, eliminates damage from forcing open frozen doors
- Assures tight seal at all times, prolongs gasket life.

ZEROSEAL GASKET

TRIPLE SILLSEAL GASKET

Exclusive JAMISON Gasketing

"Zeroseal"

- Wide, flat seal
- Extends around sides and top
- Extra resilient and pliable

"Sillseal"

- Triple Wiper Seal
- Flexible, abrasion and grease-resistant
- No capillarity

Full details on the Jamison Super Freezer Door are contained in Bulletin #5. Write for your copy to Jamison Cold Storage Door Co., Hagerstown, Md.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.